Construction Methods AND EQUIPMENT

FEBRUARY, 1960

PRICE $1.00

A McGRAW-HILL PUBLICATION

In Pittsburgh, crew tops out the roof of the 22-story 4 Gateway Center Building.

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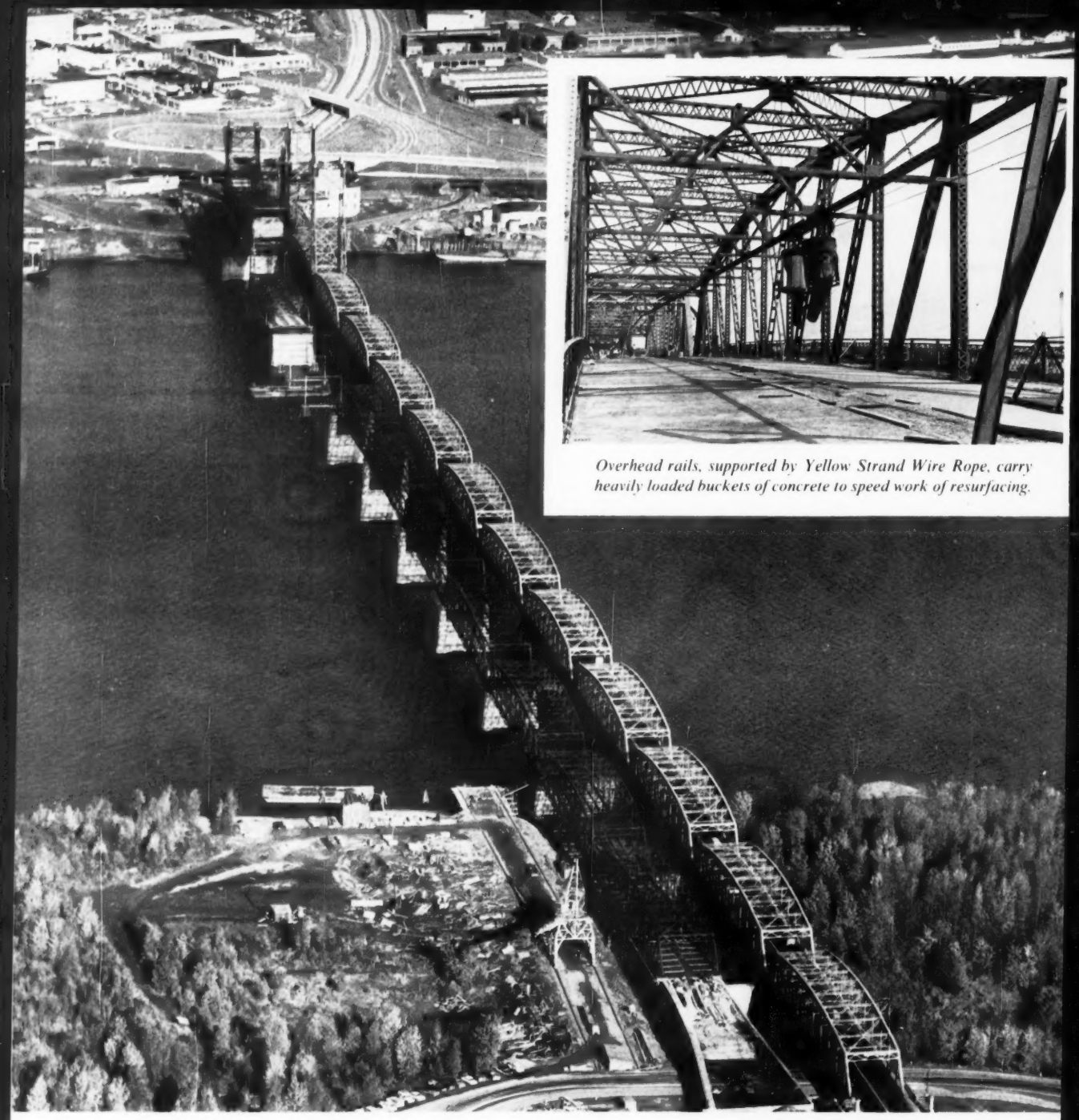


Overhead rails, supported by Yellow Strand Wire Rope, carry heavily loaded buckets of concrete to speed work of resurfacing.

They raised a bridge over the Columbia River at Portland, Ore.

Interstate Highway #99 connecting Portland and Vancouver called for 8-lane traffic over the river. To save money, a new 4-lane bridge was constructed to match an original bridge which has been in service since 1917. The old bridge had to be raised to match the height of the new one.

General Construction Co. of Portland was awarded the job of raising and "face lifting" the old bridge. This contractor selected Yellow Strand Wire Rope for heavy lifts and for supporting critical loads.

Successful contractors know they can depend on Yellow Strand Wire Rope for every job. You can, too! Call your Yellow Strand Distributor. Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Missouri.

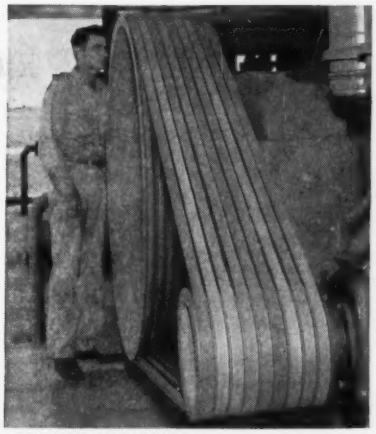
Yellow Strand®

WIRE ROPE SLINGS CLIPS

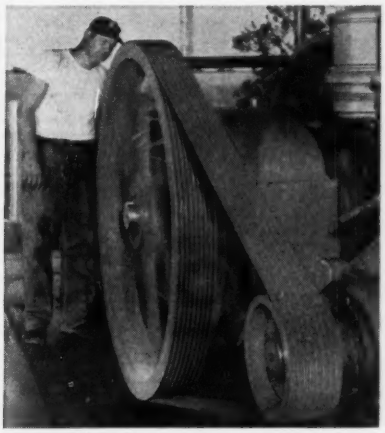
B.F.Goodrich

V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY



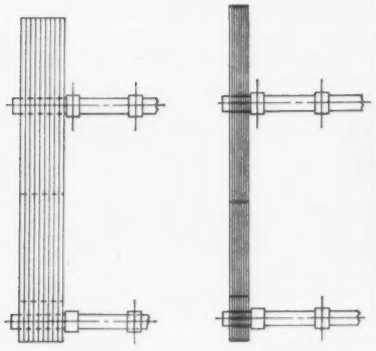
ORDINARY V BELT DRIVE



MAXIPOWER DRIVE

SAVE $402.14 ON V BELT DRIVES—*Costs for* both *sheaves and V belts were cut when B.F. Goodrich Maxipower belts replaced ordinary belts on this drive. Size and weight of sheaves were reduced, smaller and fewer V belts were used*—eight *5V2500 belts replaced* nine *D-240 belts. The result: a $402.14 saving. Costs can be cut as much as 30% by switching to a Maxipower V belt drive.*

How Maxipower V belts reduced bearing load 42%

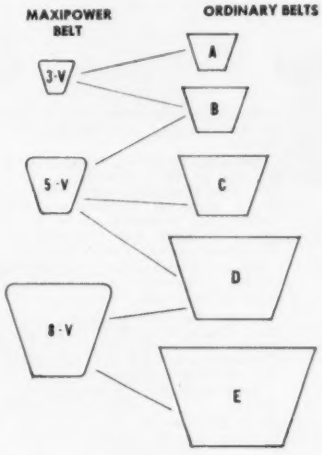


ORDINARY DRIVE MAXIPOWER DRIVE

In the installation shown above, sheaves for the Maxipower drive are lighter, have a face width of only 5 13/16", compared to a 13¼" width for the sheaves on the ordinary drive. Because there's less weight, less shaft overhang, bearing load for this Maxipower drive is 42% less for the driven shaft shown than the drive replaced. This greatly increases bearing life.

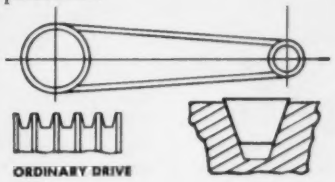
With Maxipower V belts, three cross sections do the work of five

Each cross section of the new B.F. Goodrich Maxipower V belts has been fitted to a particular horsepower range so that only three cross sections are needed instead of the A, B, C, D, and E sections of conventional V belts. The three cross sections are 3V, 5V and 8V.

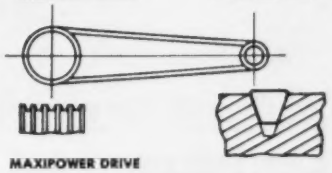


New BFG Maxipower V belts save space, weight, bearings, dollars

New B.F.Goodrich Maxipower V belts give up to three times the horsepower-carrying capacity in the same amount of space as ordinary belts. This more compact drive gives you more horsepower per dollar, results in substantial savings, both in initial costs and often in belt replacement.



ORDINARY DRIVE



MAXIPOWER DRIVE

In most Maxipower installations, fewer belts and smaller diameter sheaves are used, center distances are shorter. Costs can be cut up to 30%, valuable space is saved. Sheaves have narrower grooves and groove spacing, are smaller, less costly. The smallest sheaves that can safely be used with the drive motor can be installed. Often these will be 50% smaller than present drives. This reduced sheave weight and face width means less shaft overhang, less bearing load—increased bearing life.

The extra strength of Maxipower V belts comes from its new rubber compounds, the tough fibers used in its load-carrying cords, and the new "deep V" design. Because of this design the belt's load-carrying cords are supported so completely that each has an equal share in the load—none "loaf".

All Maxipower V belts are heat-resisting, oil-resisting at no extra cost. Belts with static conducting properties can also be ordered *at no extra cost.*

For further information and help in selecting Maxipower belts for your drives, call your B.F.Goodrich distributor. *B.F.Goodrich Industrial Products Company, Dept. M-791, Akron 18, Ohio.*

B.F.Goodrich V belts

HOW TO HANDLE WET JOBS

FAIRCHILD ENGINE & AIRCRAFT BLDG.

Islip, Long Island, N. Y.

Sub. Contr.: Washington Conc. Corp.

Gen. Contr.: John W. Harris

WATER LOWERED 11 FT AT RATE OF ONE FT PER HOUR

ANYONE WHO HAS tackled a wet job in extremely coarse sand and gravel knows what torrents of water drain through such pervious soil. Yet 11 hours was all it took for the Griffin Wellpoint system shown in photo to give a bone-dry subgrade. Excavation of the 20,000 sq ft area then proceeded rapidly by tractor-scraper.

Upon the recommendation of Alman, Fordice & Handy, architects, the wellpoint system was maintained in operation until danger of flotation was eliminated by construction.

• Footnote: drainage of surrounding area caused 4 ft drop in static level of a well 400 ft away. Got a "big dry"? Specify Griffin.

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WELLPOINT CORP.

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FEBRUARY, 1960

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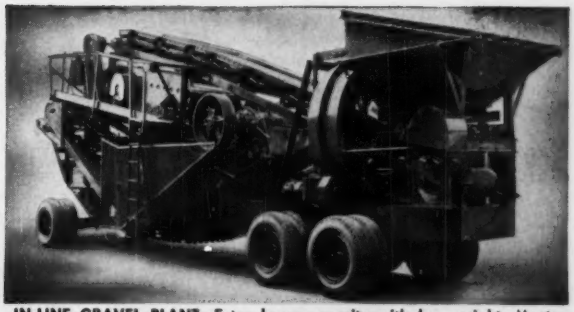
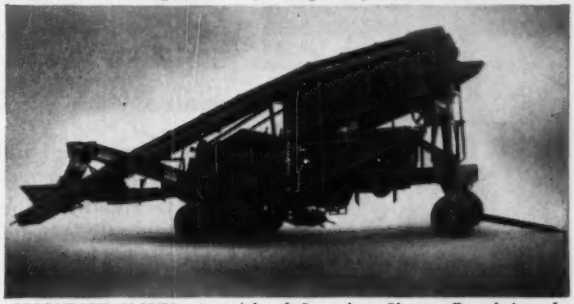
PRIMARY PLANTS: Use with Intermediate and Secondary Plants or alone for producing ballast. Jaw crushers 1524 to 3042 in size. Choice of portable apron or built-in feeder. Some have scalping screen ahead of crusher.



IN-LINE GRAVEL PLANT: Extra large capacity with low weight. Meets most highway load limits. Has 1036 jaw crusher, 30" x 24" rolls, 4' x 12' — 2½ deck vibrating screen . . . yet weighs only 55,900 lbs. on the road!

INTERMEDIATE PLANTS: Used with Primary and Secondary Plants to increase flexibility of operation and boost output. Meets highway height, width, and weight limits. Models offer choice of either jaw or roll crusher.

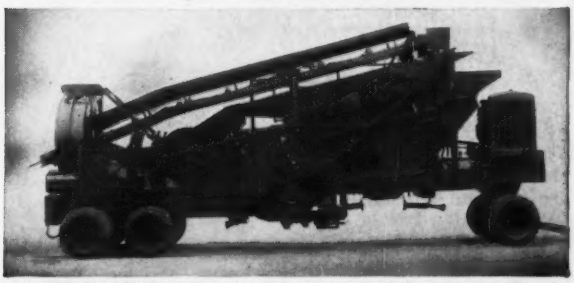


SECONDARY PLANTS: 4 models of Secondary Plants offer choice of 3018, 4022, and 5424 twin roll crushers or 4022 triple roll crusher with 3' x 10', 4' x 10', or 4' x 12' — 3½ deck vibrating screens.

For men who like to underbid their competitors . . . (and make a nice profit, too)

Pioneer Portable Crushing Plants

BOTTOM DECK FEED PLANTS: Exclusive method of routing material through plant gives *twice* the effective screening area of conventional plants, also lets operator equalize load between jaw and roll crusher while plant is operating. These and other features, give extra capacity and unusual control of gradation. Four models.



44 AND 45 SERIES: Full deck sand screen rejects fines and small rock bypasses jaw crusher. These and regular Bottom Deck Feed features

PIONEER Distributors and PIONEER's own field engineers are experienced in all phases of aggregates production. They will be glad to study your project, analyze your needs, then help you design an efficient installation that will fit your need.

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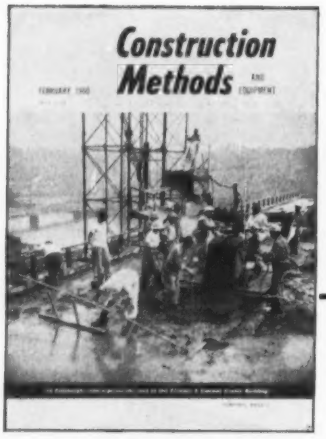

ON THE COVER

High above the Monongahela River, a fleet of Whiteman Power Buggies delivers cinder concrete for the 4-in. roof slab of a new office building. Designed for a 50-psf load, the slab is reinforced with 2x16-6/10 welded wire fabric that is draped continuously from top of beams to near bottom of plywood forms. George A. Fuller Co. is general contractor for the structure, and Brennan & Sloane is concrete sub.

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NEXT MONTH

Moving 240-ton prestressed girders from casting yard to position in a bridge crossing Oneida Lake near Syracuse, N. Y., called for plenty of ingenuity on the part of the contractor. They devised a carriage on which the huge units roll into place across a temporary bridge.

Photo Credits—73 (top) Hollenzer and Co. Ltd., (bottom) Randazzo and Morrison, Inc., 80 (bottom) Derby Aero Survey Ltd., 84 Joseph V. Tompkins, 162 (bottom) Morton-Walkers Co.

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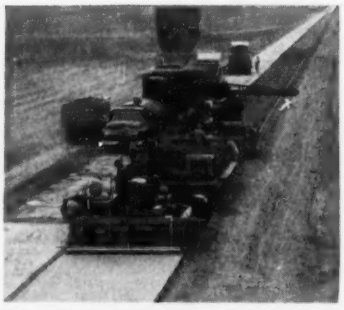
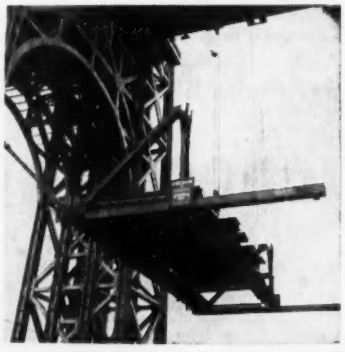
Pay Dirt in This Issue



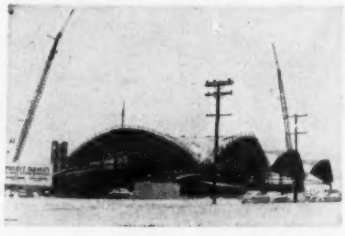
Paving a Reinforced Slab in One Lift..... 84

An Oregon roadbuilder first dumps and spreads concrete to the top of the forms, then vibrates mesh and joint dowels into place through the concrete with his job-built rigs.



Trolleys on Bridge Erect Lower Deck 92

To erect the steel for the lower deck of the George Washington Bridge over a busy parkway, Bethlehem Steel Co. built a fast-moving overhead trolley system.



Formwork for Curved Roof Is Massive but Movable..102

Forms for an intersecting barrel arch roof were shop-fabricated to precise dimensions. Each of the big sections weighs 16 tons but moves from pour to pour in one piece.

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No other machine can dig so close to pipes, water lines and curbing *without damage*...and do it so fast!

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"Big Dig" for profits

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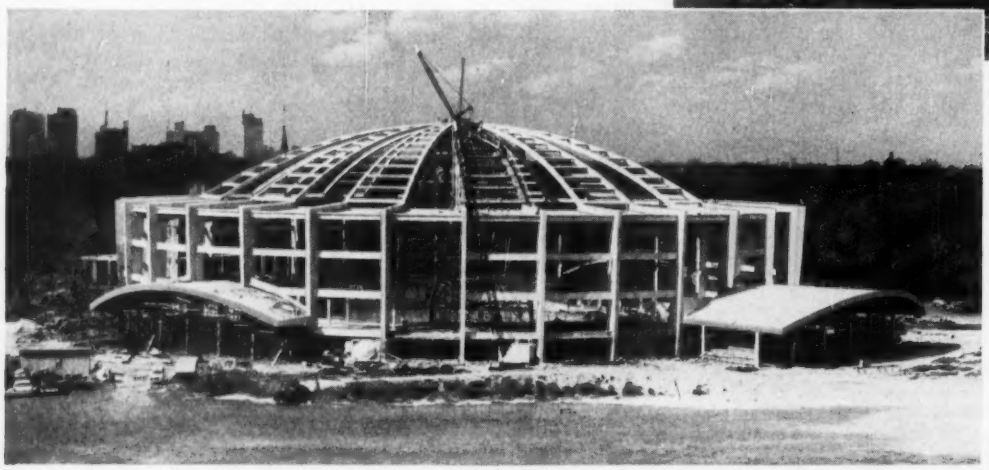
CONCRETE FRAME FOR NEW JACKSONVILLE COLISEUM

Lehigh Early Strength Cement Used in Unique Roof Structure

• Rising next to the famed Gator Bowl in Jacksonville, Florida, is a reinforced concrete frame providing a support free area 302′ in diameter for the new 12,000 seat Sports Coliseum. Lehigh Early Strength Cement and Lehigh Portland Cement are being used throughout.

A concrete ring 25′ in diameter was poured first atop the center support of this huge two-pronged form. Then the circular roof ribs were poured in pairs in prong forms (only one visible), tying the center ring and outer roof together. After each pour, prongs were lowered 3′ hydraulically and rotated to next position.



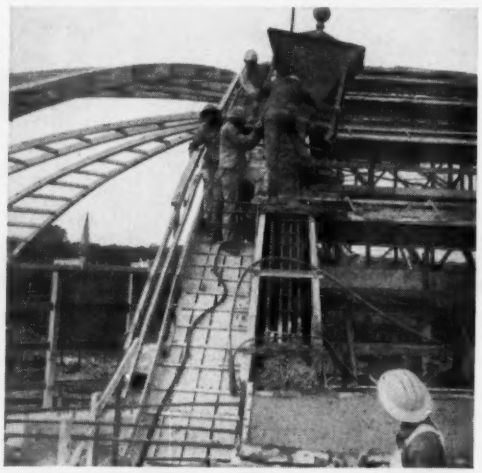
Clear span at base of structure is 302′. Height to center roof ring is 95′. Height to perimeter roof is 65′. Circular roof rib radius is 250′. Two of three entrances take shape in foreground.

Use of Lehigh Early Strength Cement in the perimeter roof made it possible for Daniel Construction Company to use fewer sets of forms while meeting a fast construction schedule. In the circular roof ribs, this cement provided the high early strength concrete necessary for most efficient use of the huge two-pronged form (see pictures).

This is another example of why we say, "Somewhere on nearly every job, Lehigh Early Strength Cement can save time and money." Lehigh Portland Cement Company, Allentown, Pa.

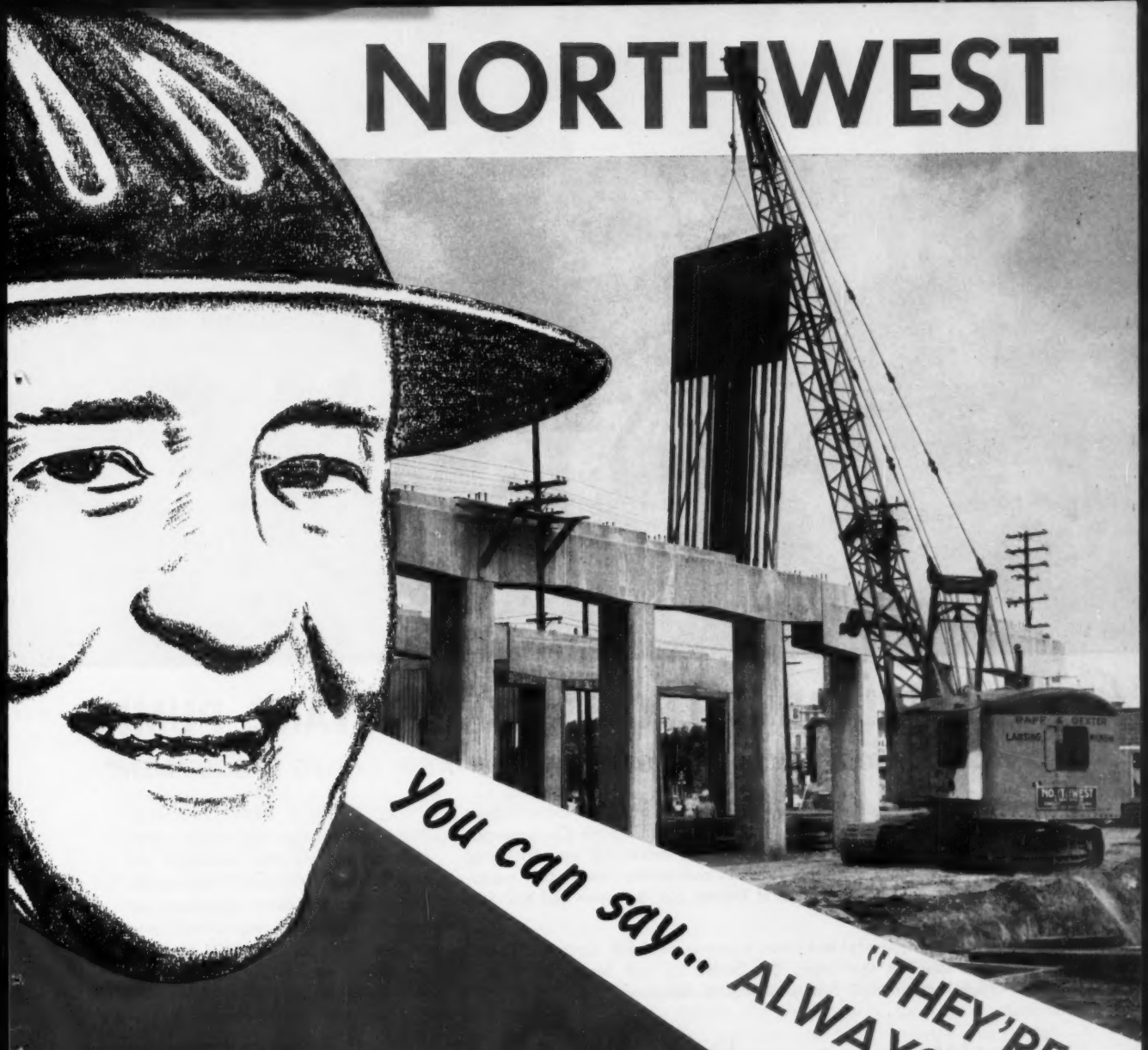
LEHIGH CEMENTS

Owner: City of Jacksonville, Florida • *Architect:* A. Eugene Cellar and George Ryad Fisher, Jacksonville, Fla. • *Structural Engineer:* Gomer E. Kraus, Jacksonville, Fla. • *Contractor:* Daniel Construction Company of Florida, Jacksonville, Fla. • *Ready Mix Concrete:* Southern Materials Company of Florida, Jacksonville, Fla.



Placing concrete for roof ribs high above coliseum floor.

NORTHWEST



You can say... "THEY'RE ALWAYS READY TO GO!"

Crane and Shovel production is not measured by the speed of a hoist rope or the number of revolutions per minute. Production is the result of maintained steady month in and month out operation. *Northwests get the job done* — not for a day or a shift, but month in and month out, year in and year out.

Northwest construction insures that marvelous advantage of always being ready to go. Their purpose is to make money for you and they have proved their ability to earn a profit on jobs the world over.

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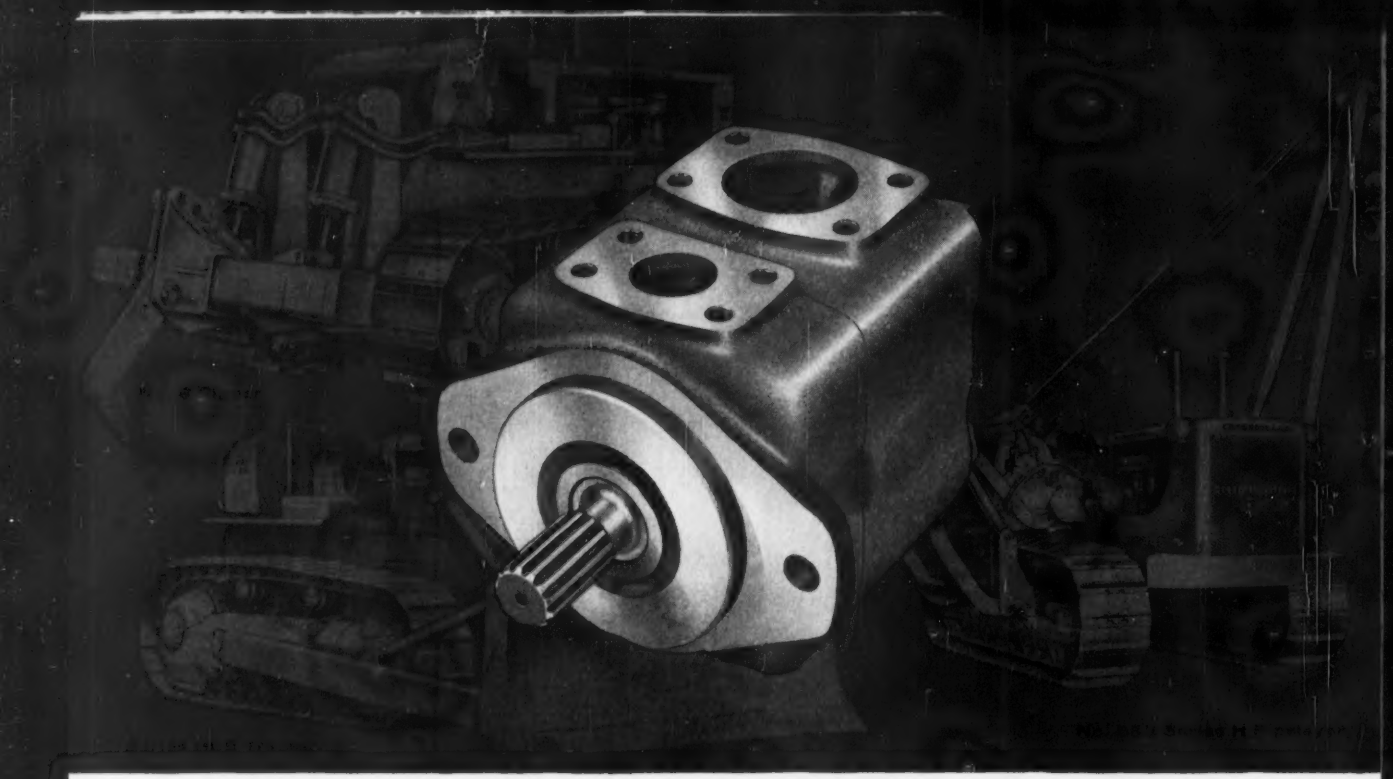


CATERPILLAR SELECTS VICKERS VANE PUMPS

"HIGH PERFORMANCE" PUMPS PICKED FOR NEW SERIES H EQUIPMENT

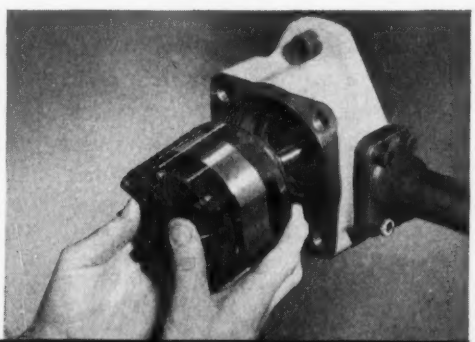
Continuing critical selection and evaluation of all component items used on its machines helps make Caterpillar Tractor Co. outstanding in its field. Thorough engineering, advanced manufacturing, and top-quality materials result in cost-cutting construction equipment . . . the new D8 Series H Tractor, No. 8 Ripper and No. 583 Series H Pipelayer.

To assure dependable hydraulic power on these machines, Caterpillar specifies the Series 25, Series 35 and Series 45 Vickers "High Performance" Pumps as original equipment.

VICKERS "HIGH PERFORMANCE" PUMPS (larger sizes and double pumps soon to be released) represent the most complete range of high speed, high pressure pumps for construction and material handling equipment ever offered. Send for **BULLETIN M-5108** for further information and performance characteristics.

Complete pump overhaul in 10 minutes in the field...

Replacement cartridges for "High Performance" pumps contain all normal wearing parts and insure "As New" results. Following vehicle manufacturer's instructions, cartridge can be quickly changed without removing pump from vehicle and usually without disconnecting hydraulic lines. Caterpillar Dealers provide cartridges and replacement service in the field.



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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

There's a reason WHY in MacWHYte Wire Rope*

It brings out the best in your equipment!

Just as you use specialized equipment for a particular job, it pays to use the right kind of wire rope designed for that equipment.

All wire rope isn't the same. There are changes in the construction of wire rope . . . which aren't obvious to the eye . . . but can seriously affect the way it will work on your equipment. Because all equipment isn't the same, different types of rope are required because of basic design variations.

With this in mind, you can see the reason "why" Macwhyte offers such a wide variety of wire rope:

* Every foot of wire in Whyte Strand is specially drawn, cold-worked by Macwhyte in their own wire mill. Complete processes — from raw material to finished wire for rope — are under the watchful eyes of Macwhyte metallurgists.

* Product engineers determine the exact number, size, and relationship of the wires needed to meet the requirements of your equipment. You're sure of the correct size, strength, and flexibility.

* Special lubrication is available in accordance with the needs of the equipment or the type of service in which the rope will be used. The tenacious lubricants provide just the necessary protection — are unaffected by heat or cold, dry or wet conditions.

* Entire wire and rope mill operations are concentrated on the making of wire rope in a thousand and one sizes, grades, and types . . . to give you the rope you need.

Result: Whyte Strand wire rope is literally "custom made" for shovel hoist rope, dragline, clamshell crane rope, boom hoist line, dozer rope, scraper rope, contractors' hoist and derrick rope, overhead cranes, cableway excavators, and winch lines. If you'd like to check the type of rope recommended for your equipment, send for bulletin 5702 — free for the asking.

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'FASTER from FOSTER'

exact sections and lengths of steel-sheet piling
no investment, no hidden costs, no delays

Today more and more contractors are writing "savings" into their steel-sheet piling specifications by renting from L. B. Foster Company. They get the exact section they need—straight, archweb or Z—in any quantities, cut to the exact lengths the job requires.

When you need steel-sheet piling, check the advantages of Foster's Piling Rental Plan. One call delivers "complete package" shipments (including matching corners and connections, hammers, extractors)—at one low, fixed expense directly chargeable to the work in progress. And because nationwide stocks assure "on-time" deliveries right to the job site, you don't have to tie up working capital in unnecessary long-term piling inventories. Your nearest Foster office will be glad to work with you—from estimate through final delivery.

Call Foster for Lightweight Piling, Pipe Pile, H-Bearing Pile, Aluminum Railing, Highway Products, Rail and Pipe

Refer to Sweet's Industrial Construction File, or send for Piling Catalog CM-2.

Construction News From Washington

Washington, D.C.
February 1960

Less Federal Money for Construction

Construction will get fewer federal dollars in the fiscal year that begins next July 1. The President's budget reduces funds for construction by more than 4%—down from $7.7 billion in the current year to $7.47 billion in fiscal 1961.

The budget makes it clear that the Administration will continue to fight for tight limitations on federal spending for college housing, hospitals, pollution control, schools, and housing.

But the big cuts are in military and federal-aid highway construction. The budget calls for cuts of about $300 million in each of these areas. A $240-million cut in Air Force construction accounts for most of the drop in military work.

A Long List of New Starts

The bright spot in the budget picture is the President's recommendation that Congress provide funds to start 46 new projects for development of water and power resources. This is a reversal of the Administration's stand against new public works starts.

President Eisenhower proposed 31 projects that will cost $306 million to be built by the Corps of Engineers, six projects to cost $187 million for the Bureau of Reclamation, five local irrigation developments to be financed by $11 million of bureau loans, three Tennessee Valley Authority projects to cost $130 million, and an $11-million levee on the lower Rio Grande River to be built under the jurisdiction of the International Boundary and Water Commission.

The Corps of Engineer projects include six that will cost more than $10 million. They are the $64-million Green Peter Dam in Oregon, the $60-million Milford Reservoir in Kansas, the $42-million Poe Lock in Michigan, the $32-million Maxwell Lock and Dam in Pennsylvania, the $30-million Baltimore Harbor Improvement Project, and the $13-million Fox Point Hurricane Barrier in Rhode Island.

Three of the six new Bureau of Reclamation jobs will cost more than $10 million. The biggest is the $107-million Yellowtail Dam and Power Plant in Montana. Others are the $45-million Blue Mesa Dam of the Curecanti Project in Colorado and the $15-million Almena Irrigation Project.

Along with the new starts, the President approved the largest combined expenditures on record for Army civil works and reclamation activities. Budgeted spending for the two totals $1.2 billion.

Approved expenditures for Army civil functions add up to $936 million, the highest in history. Of this total, more than $740 million

will go directly for construction. Budgeted reclamation spending of $310 million also is close to the record high. Of this amount, nearly $235 million is earmarked for construction.

Battle of the Highways

Congress may not go along with the President's recommendations for cuts in the highway building program.

Federal aid authorizations must be voted this year for non-interstate roads on the primary, secondary, and urban nets (known as the ABC systems). The President proposed that these authorizations be reduced to $900 million a year, $25 million less than has already been allocated to the states for fiscal 1961. But it's a good bet that Congress won't make this cut.

Congress also is unlikely to accept the White House proposals to hold aviation gasoline tax receipts out of the Highway Trust Fund and to charge the fund with the cost of forest and public land highways.

But major decisions on highways won't come until next year. Then Congress will make a thorough study of the roadbuilding program.

Public Building Set to Start

Appropriations this year will include funds to start a wide range of federal buildings. The President's budget gives advance approval of $160 million for 16 office structures plus about $200 million more for special purpose buildings of government agencies throughout the country. Under long-lease contracts, the Post Office Department expects to start about 1,400 buildings costing $67 million in the 1961 fiscal year.

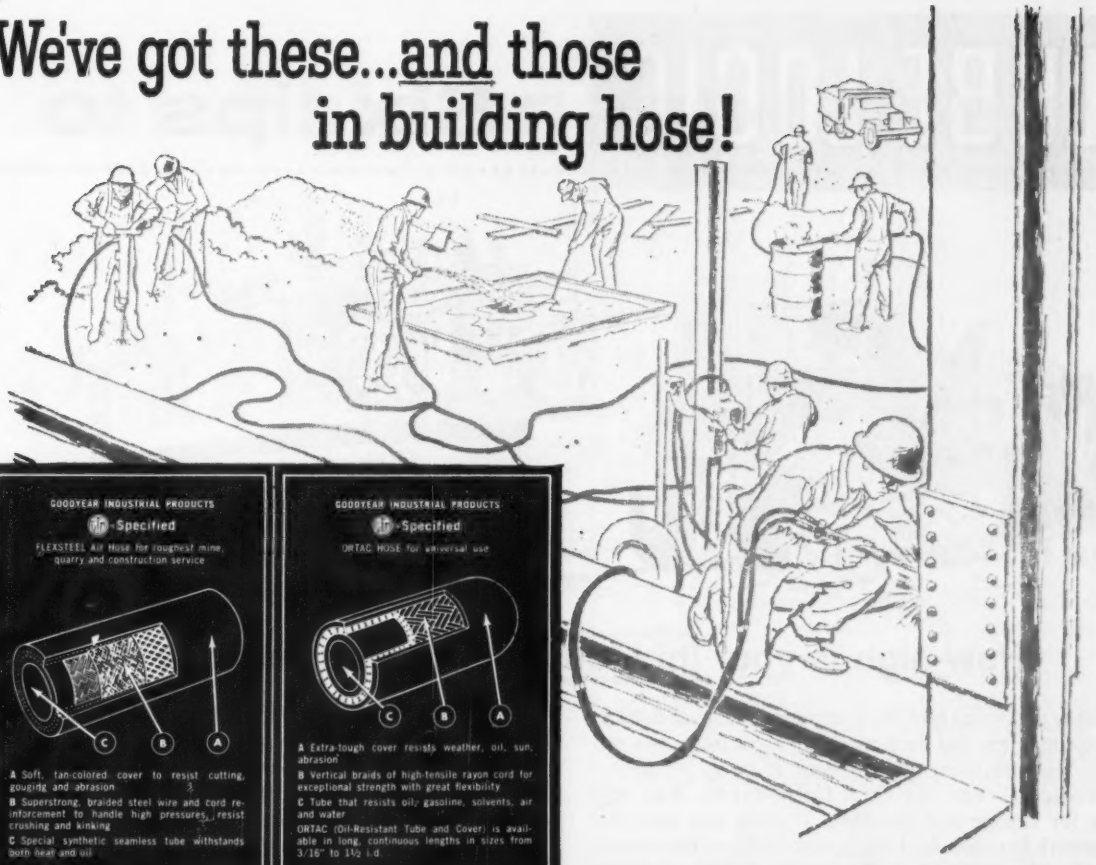
Construction Picketing

Labor leaders want one piece of labor legislation out of the new Congress: an amendment to the Taft-Hartley Act to end what is now an effective legal ban on picketing construction sites.

They want to permit the Building Trades to picket a construction site even though their target is only one contractor and even though a number of innocent contractors on the project may be hurt by the picket line. The Taft-Hartley Act now makes this illegal.

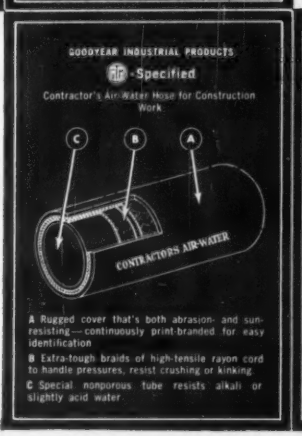
The AFL-CIO demand for this legislation was dropped last year when the labor bill was passed, but Congressional leaders promised to try again this year. There's a risk in this for the labor leaders. Congress, if it shows signs of amending Taft-Hartley, will be pressed by business groups to consider some other amendments labor leaders don't want.

We've got these...and those in building hose!

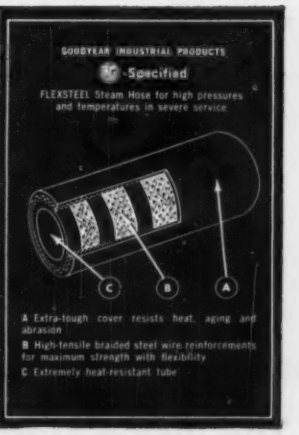


GOODYEAR INDUSTRIAL PRODUCTS
Air-Specified
FLEXSTEEL Air Hose for roughest mine, quarry and construction service
C
B
A
A Soft, tan-colored cover to resist cutting, gouging and abrasion
B Superstrong, braided steel wire and cord reinforcement to handle high pressures, resist crushing and kinking
C Special synthetic seamless tube withstands both heat and oil

GOODYEAR INDUSTRIAL PRODUCTS
Air-Specified
ORTAC HOSE for universal use
C
B
A
A Extra-tough cover resists weather, oil, sun, abrasion
B Vertical braids of high-tensile rayon cord for exceptional strength with great flexibility
C Tube that resists oil, gasoline, solvents, air and water
ORTAC (Oil-Resistant Tube and Cover) is available in long, continuous lengths in sizes from 3/16" to 1½ i.d.


GOODYEAR INDUSTRIAL PRODUCTS
Air-Specified
Contractor's Air-Water Hose for Construction Work
C
B
A
CONTRACTORS AIR-WATER
A Rugged cover that's both abrasion- and sun-resisting—continuously print-branded for easy identification
B Extra-tough braids of high-tensile rayon cord to handle pressures, resist crushing or kinking
C Special nonporous tube resists alkali or slightly acid water

GOODYEAR INDUSTRIAL PRODUCTS
Air-Specified
SPIRAFLEX Welding Hose for oxyacetylene welding, cutting, chipping
C
B
A
A Corrugated cover for firm grip and long wear—one line red, the other green for hook-up identification
B Superstrong rayon braid reinforcement
C Nonporous, nonblooming, nonflaking tube


GOODYEAR INDUSTRIAL PRODUCTS
Air-Specified
FLEXSTEEL Steam Hose for high pressures and temperatures in severe service
C
B
A
A Extra-tough cover resists heat, aging and abrasion
B High-tensile braided steel wire reinforcements for maximum strength with flexibility
C Extremely heat-resistant tube

HIGH pressure or low—for air, water, steam, oil or gas—the smart choice in hose is Goodyear.

For Goodyear hose is built for builders: Its cover is super-tough to resist rough handling. It's heavily muscled with high-tensile cord or steel reinforcements. It resists kinking or crushing. Yet it's flexible and easy to maneuver.

Wouldn't it pay you, then, to insist on Goodyear quality on your next hose-using job? Check with your Goodyear Distributor for details on the special line that's designed to meet every contracting need. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

IT'S SMART TO DO BUSINESS with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."

the big name in hose is

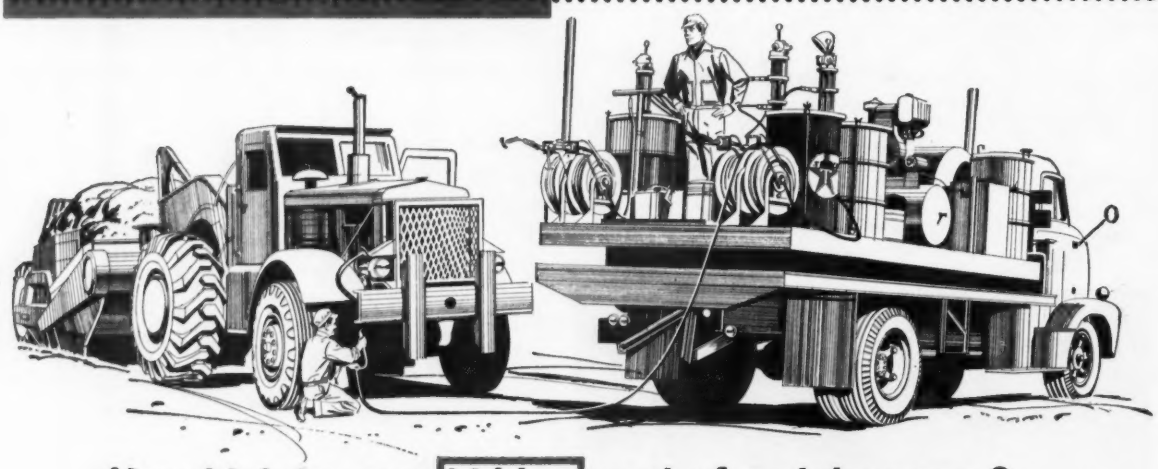
GOODYEAR

Flexsteel, Ortac, Spiraflex—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

THE GREATEST NAME IN RUBBER

LUBE LOGIC

Six tips to

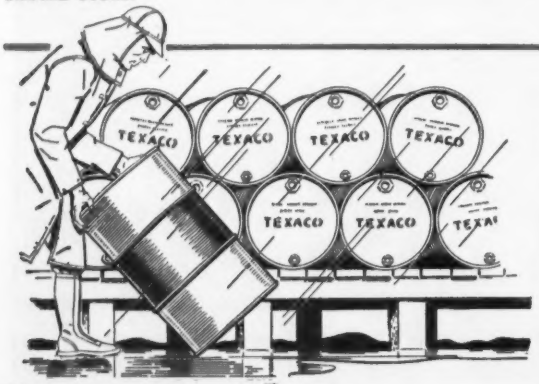


How high is your hidden cost of maintenance?

You may not realize how many extra maintenance dollars you spend when you keep many different lubricants on hand. (Six are often all you need to cover all major maintenance.) You pay extra for inventory. You pay extra for storage and handling. It costs you more in paperwork to order. And you'll have to figure the wasted cost of equipment parts and downtime if misapplication should occur.

The Texaco Lubrication Plan helps you reduce or even eliminate these hidden costs. That's because it provides the minimum number of *proven* multi-purpose and special lubricants, tailored to your job requirements.

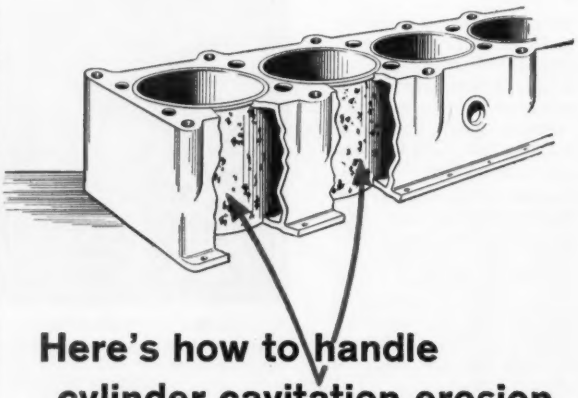
You'll do yourself a favor when you check with a Texaco Lubrication Engineer. He'll carefully plan your lubrication needs—then follow them up to see that your lubrication problems are taken care of fast.



The inside story on outside storage

You're short-changing yourself if you skip these simple precautions: drums stored outdoors should be placed on their sides. When stored on end, expansion and contraction through temperature changes can suck in rain water that collects on top of the drum.

Want to warm up lubricants that have become stiff from cold? *Don't* heat them with an open flame. You might melt the sealing compounds, and the drum will leak. You might also damage the product with too much heat in one spot. Put the drum indoors for a while before using.



Here's how to handle cylinder cavitation erosion

High pressure cooling systems in use in most supercharged diesels are subject to coolant aeration. This aeration can cause cavitation, leading to serious cylinder liner corrosion-erosion, unless a rust preventive is added to the water. A good antifreeze (like Texaco PT antifreeze) will do the job in winter—but in summer a 1% to 2% solution of Texaco Soluble Oil C will do a fine job. (Remember to flush out before you add antifreeze again.)

cut maintenance costs

OIL GAUGES SPEAK A LANGUAGE ALL THEIR OWN

Look to your oil gauge pressure for clues to a variety of potential engine ailments. For example:

LOW OR NONE

1. Oil pump pickup stuck high.

LOW

1. Clogged oil pump screen.
2. Excessive main, con-rod, camshaft or rocker-arm bearing clearances.
3. Clogged full-low filter, if by-pass isn't working.
4. Excessive dilution of oil with fuel.
5. Enlarged squirt holes.
6. Loose connections or cracks in oil line.

LOW OR ERRATIC

1. Faulty oil pump.
2. Restriction in oil pan, or oil too viscous to keep oil pump intake supplied.

LOW OR HIGH

1. Faulty gauge.
2. Ineffective oil cooler depending on type, may keep oil too cold or provide insufficient cooling.

HIGH

1. Oil with viscosity too high for climate.
2. Sludge and contamination in the oil.
3. Clogged oil passages on the pressure side.

HIGH, LOW OR ERRATIC

1. Improper setting or failure of pressure relief valve.

ERRATIC, LOW, THEN NONE

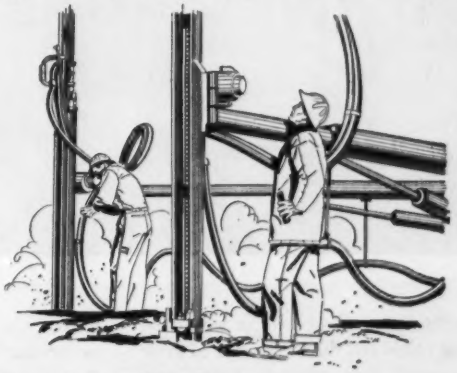
1. Crankcase oil level just at or below oil pump pickup.

NO MOVEMENT OR DELAYED ACTION

1. Clogged line to gauge.

Don't let engines foul up!

If the fuel injector on a diesel drifts off or "dribbles," incompletely burned fuel will contaminate the crankcase. The result will be plenty of smoke—and probably engine trouble. The injector should be fixed immediately—but if it can't be, start shortening drain periods to remove the damaging oil-fuel mixture. Also, use an oil with full detergent and dispersion properties to keep other undesirable products out of the engine.



New product for rock drill couplings

Actually, it's an old friend, Marfak Heavy Duty #2, in a new application. According to the raves from customers who've tried it, the lubricant works better on rock drill couplings than anything they've ever used.

TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers"—little angles, so easy to overlook, where big savings in time and money can be made. But month in, month out, your local Texaco Lubrication Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

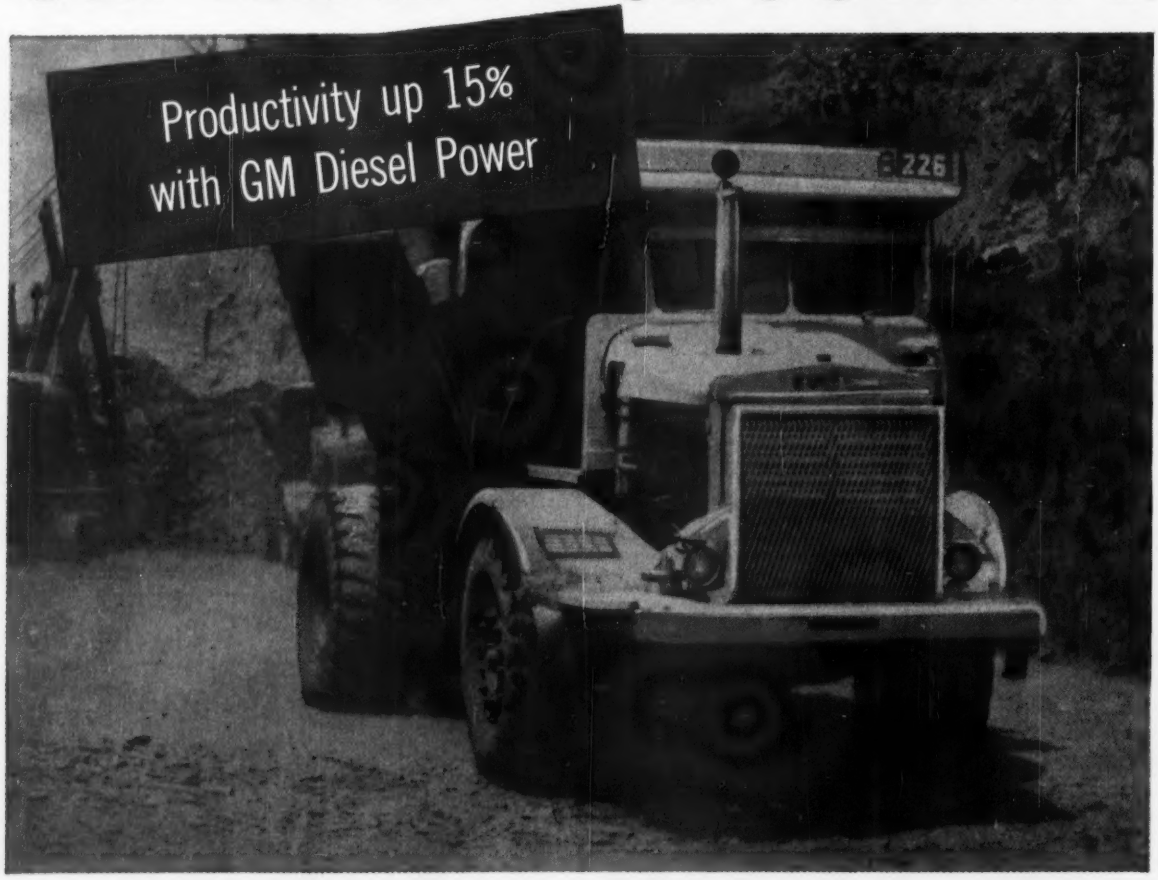
Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV

TEXACO

Throughout the United States

Canada • Latin America • West Africa

GET REAL PRODUCTIVITY



Imagine what your profits would be if you could cut down the size of your equipment fleet without losing any production. Or if you got more work done with the construction equipment you have now.

Gull-Defelice—contractors handling a major part of the Niagara Power Project—don't have to imagine, they know.

They put 6 GM Diesel-powered Euclid 27-ton rear-dumps to work side by side with 6 more "Eucs" powered with other Diesels—kept a sharp eye on productivity per unit.

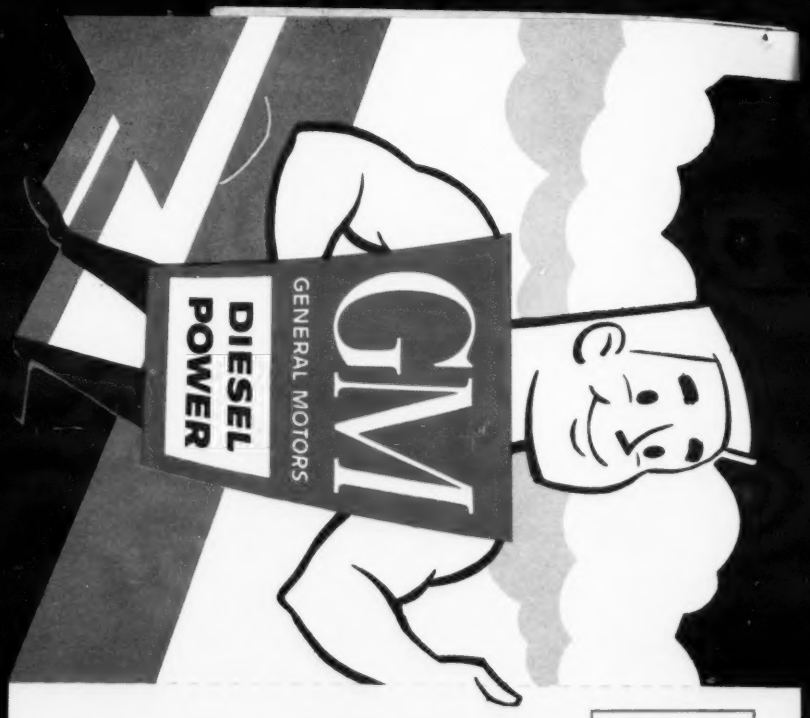
Result? The GM Diesel-powered trucks hauled an average of 78.68 tons per hour compared with 68.12 tons for the other rear-dumps. On an 8-hour shift, that adds up to 84.48 *more* tons hauled.

What's more, Gull-Defelice found it cost 25.4% *less* to operate the "Jimmy" powered units on a ton-hour basis.

You, too, can boost your productivity —realize more profit from your equipment investment—with GM Diesel power. And on some jobs, the bonus productivity of General Motors Diesel-powered equipment could well save you the cost of an additional scraper or dump truck.

Before you figure your costs on your next bid, find out the savings you can make with GM Diesel power. See your GM Diesel distributor for full information or mail the attached postcard today.

GM DIESEL ALL-PURPOSE



BUSINESS REPLY CARD

First Class
Permit 10,688
PAID
Section 34.9
PL & R,
Detroit, Mich.

5¢ POSTAGE WILL BE PAID BY

GM DIESEL
Dept. M-1
13400 West Outer Drive
Detroit 28, Michigan

GM DIESEL—DEPT. M-1
13400 WEST OUTER DRIVE
DETROIT 28, MICHIGAN

Please send me full information on the All-Purpose Power Line. I am interested in buying ..... (type of equipment)

I am interested in repowering ..... (type of equipment)

NAME .....

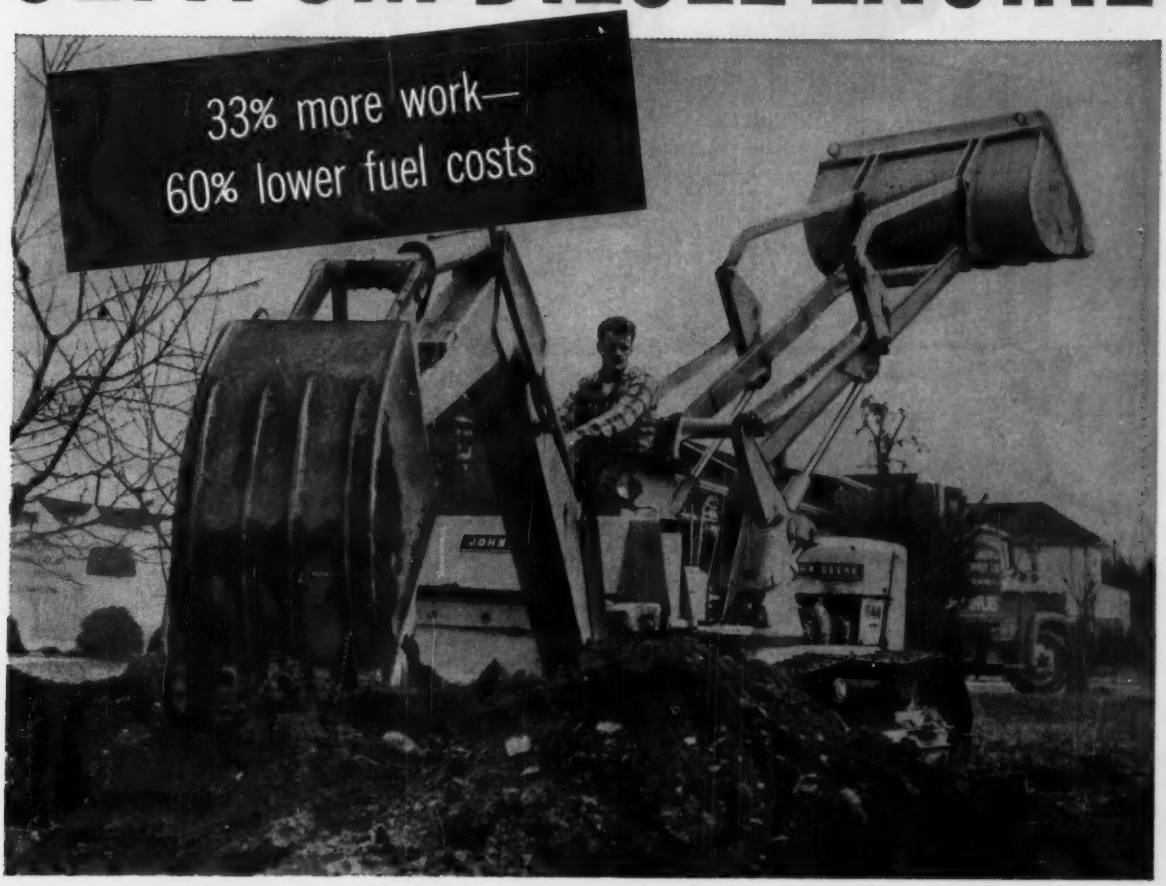
COMPANY .....

ADDRESS .....

CITY .....

ZONE ..... **STATE** .....

GET A GM DIESEL ENGINE



Load a 5-yard dump truck with a ⅞-yard front-end loader in two minutes and you're really moving dirt.

And that's exactly what Robert Kruger of Emerson, N. J., is doing with his General Motors Diesel-powered John Deere 440 ICD.

He replaced a gasoline-powered unit with this tractor, says his new rig "works ⅓ faster—cuts fuel bills 67%—delivers lots more power."

And he'll also tell you his GM Diesel-powered machine outworks other Diesel tractors with higher ratings.

And why does the 440 work so fast? Listen to Mr. Kruger: "It's the 'Jimmy's' quick response to the throttle—that engine sure revs up fast."

Mr. Kruger is earning more—saving more—because of the extra productivity he's getting since he switched to a General Motors Diesel-powered machine. You could be doing what he's doing if you had a "Jimmy" Diesel in your equipment. Details? Call your General Motors Diesel distributor—he's in the Yellow Pages under "Engines, Diesel"—or mail the postcard today.

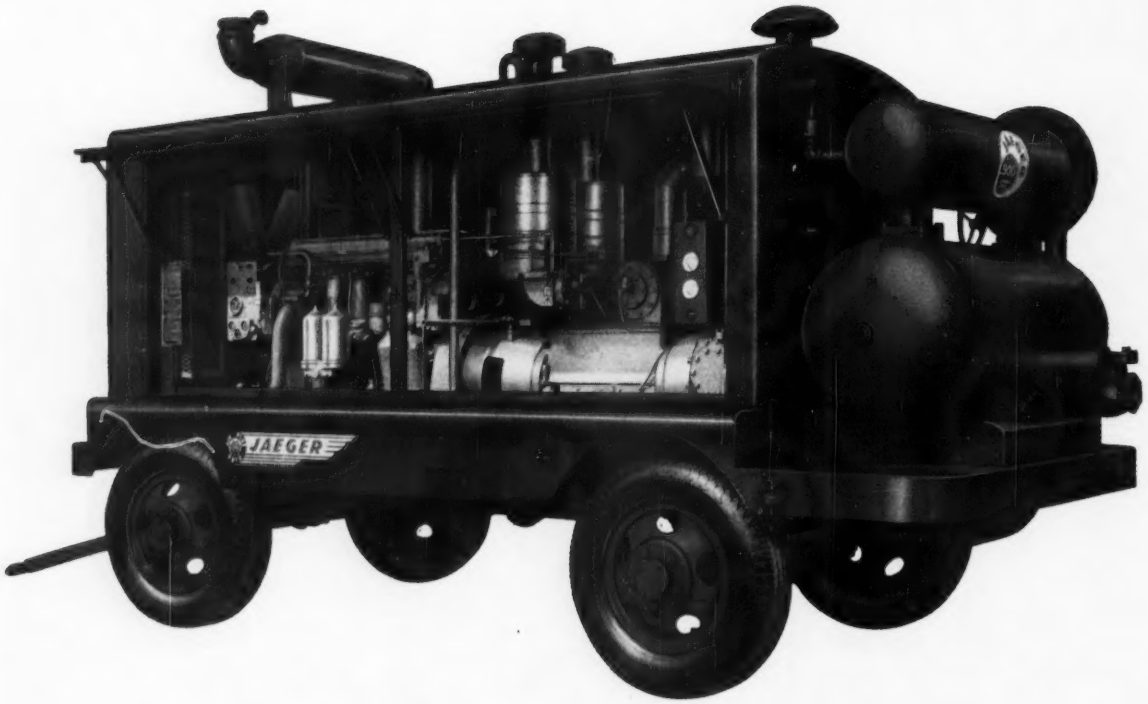
POWER LINE

Sets the standard of Diesel productivity

GM DIESEL

DETROIT DIESEL ENGINE DIVISION,
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario
Parts and Service Worldwide



JAEGER ANNOUNCES a more efficient "900" rotary

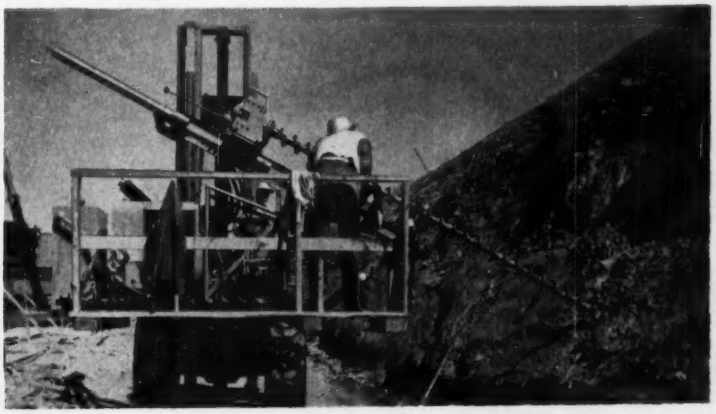
» The first "900" that delivers full capacity at a fuel-saving, engine-saving 1700 rpm . . . using the same GM 6-110 diesel which others operate at 1800. Your fuel factor is more than 500 cfm delivered air per pound of fuel consumed. *Ask your Jaeger distributor for details — or send today for complete catalog of Jaeger rotary air compressors.*

ON THIS TYPICAL ROCK JOB with two 4½" crawler-drills, the Jaeger "900" maintained 100 psig at the drills while never running faster than 1500 rpm. That's efficiency, that's fuel economy, that's long life.

THE JAEGER MACHINE COMPANY, 800 Dublin Avenue, Columbus 16, Ohio

PUMPS • MIXERS • TRUCK MIXERS • PAVING MACHINES

Job Talk . . .

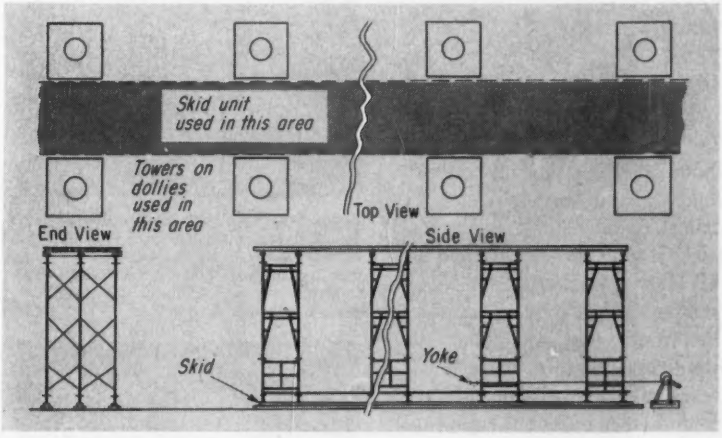


Piggy-Back Rig Drills Slanted Holes

A drill rig mounted on the mast of a fork lift truck that rides a rubber-tired tractor drills slanted holes in a shale slope at the Corps of Engineers' Gavins Point Dam, near Yankton, S. D.

The Rentlor Co., Inc., of Grand Island, Neb., devised the combined rig. The fork lift raises and lowers the drill to the varying height of the holes. The tractor moves the drill from hole to hole over terrain too rugged for the small wheels of the fork lift truck. An outrigger steadies the rig during drilling.

The job requires a total of 196 holes for anchor bolts of a retaining wall that will hold back the slope and prevent fragments from spalling off and damaging a switchyard below.



Forms for Cover Slab Slide on Skids

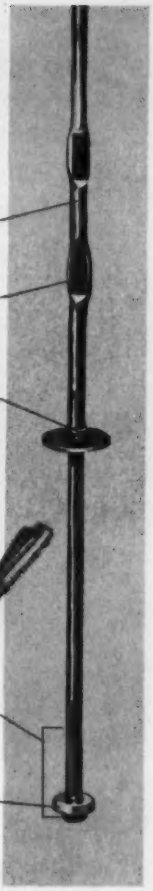
Skid-mounted scaffolding cuts the cost of forming a cover slab for a reservoir at Edina, Minn.

Columns spaced at 20 ft and topped by conical caps and drop heads will support the heavy concrete slab. Because of the amount of shoring required, contractor Phelps-Drake decided to move forms and shoring intact from one position to the next.

They laid two rows of planks along the concrete floor of each bay and greased the planks to serve as skids. On top of each skid they placed another plank and nailed to it base plates of standard Waco steel scaffolding sections. In this way they built up a unit measuring 12 to 16 ft wide, 105 ft long, and 20 ft high.

continued on page 24

only a **Snap-TY** gives you all this



1 Full-size Rod (.225 diameter) for maximum strength.

2 Offset Type Flats for better anchorage to prevent turning.

3 Upset behind spreader washer for **positive** wall size (loose or restrained washers optional).

4 Durable, malleable iron TY-Holder that is bottom-heavy and ribbed for stability. Needs no nailing!!

5 Well-formed Heads. No interference from die marks. A quality tested, precision-built TY.

6 Uniform, flat-surfaced Head Washer that insures proper bearing.

If it is not **Richmond** it is not a **Snap-TY**

Over thirty types of Snap-TYS are available—a type for every need. And all are proved, tested products with Richmond's 49 years of experience behind them.

These are the reasons why it will pay you to insist on Richmond Snap-TYS. INSIST on Richmond and BE SURE it's Richmond! Send for current Richmond Handbook which describes the full line. Write:

Richmond SCREW ANCHOR CO., INC.
INSIST ON RICHMOND ... AND BE SURE IT'S RICHMOND!

Main Office: 816-838 LIBERTY AVE., BROOKLYN 8, N. Y. Plants & Sales Offices: Atlanta, Georgia • Ft. Worth, Texas • St. Joseph, Missouri • **In Canada:** ACROW-RICHMOND LTD., Orangeville, Ontario.

Flatbed Trailers owned by Rego help speed heavy equipment to job site. Wherever there's a job underway around Bristol you're likely to find Rego . . . and you're sure to find Cities Service fuels and lubricants.

In Bristol:

It's Rego for Roads Cities Service for Rego!

For 25 years, the town of Bristol, Rhode Island, has called upon Rego & Sons to build and repair its roads . . . and Rego has called upon Cities Service to fuel and maintain all equipment.

"Just as we had to prove our worth to Bristol, Cities Service had to prove its worth to us," says Manuel Rego. "We started out 25 years ago with just two trucks. A couple of breakdowns could have put us out of business. But we had trouble-free maintenance then and we've had it ever since, using Cities Service products.

"Today, we've always got six or seven jobs going at one time, jobs that keep our cranes, shovels, compressors and other equipment in constant service. We've built our reputation on hard work, and we're happy to have had hard-working lubricants to help us."

If you're looking for lubricants that can do more than their share of work, give more hours between overhauls than you'd rightfully expect, talk with a Cities Service Lubrication Engineer. Call the nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

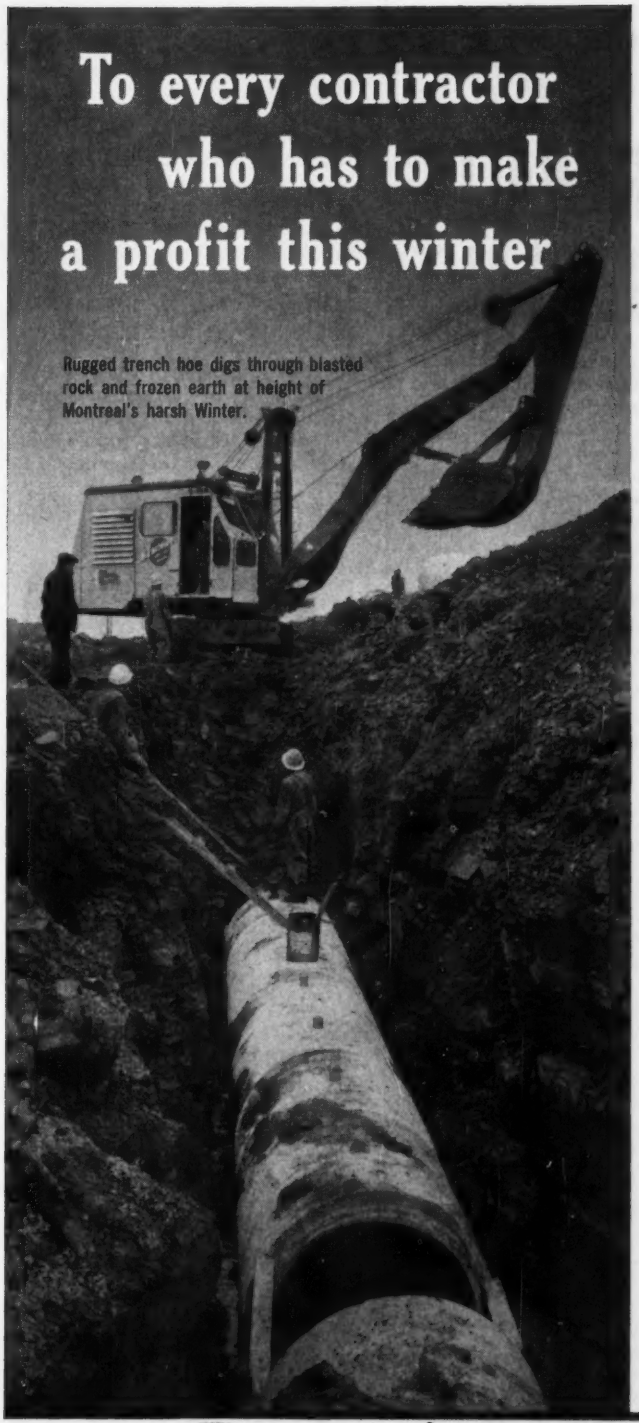
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Builds Swimming Pools, Too! Rego & Sons do wide variety of jobs for Bristol and its citizens, who have the highest regard for the firm and its work. Crane pictured here uses Cities Service C-300 Motor Oil to extend periods between overhaul.

Manuel Rego expects the same quality from his lubricants that he puts into his work. Says he gets it from Cities Service. Rego always has six or seven jobs going and can't afford breakdowns or idle equipment.

To every contractor who has to make a profit this winter



Rugged trench hoe digs through blasted rock and frozen earth at height of Montreal's harsh Winter.

AT MINUS 25 degrees, Manitowoc 1¼-yd. hoe trenches 200 feet each 10-hour shift in frozen, blasted rock

Despite severe temperatures hovering between 20° to 25° below zero last winter, this 1¼-yd. Manitowoc Trench Hoe averaged 200′ of dynamite-blasted rock and frozen earth each shift for Civil Construction, Inc. of Montreal, Quebec.

ROCK ALL THE WAY

The job involved two major sewer projects for the Corporation de Montreal Metropolitan (Metropolitan Commission for Public Works) covering over 22,000 feet of sewer trench budgeted at a total cost of $355,000. Each trench was excavated 10 to 12 feet deep, and 8 feet wide. Every foot of the job was in quarry rock that had to be blasted before the Manitowoc could move in to work.

NO REPAIRS

Taking the severe weather and tough digging in stride, the hoe put out top yardage that would have been good even under ideal working conditions — and with minimum service and attention. On this point Mr. Paul F. Tremblay, Vice President of Civil Construction, Inc., said, "We have spent almost nothing on repairs or maintenance for our Manitowoc hoe since acquiring it last Winter. At the same time, we spent over $28,000 in repairs and maintenance on our rigs of other makes. Yes, we are confident that this trench hoe will more than do its part in giving us profitable operation with a minimum of maintenance and repair costs."

Stabilize *your* profit picture this Winter with an excavator-crane that can keep the output "hot" even at minus zero temperatures. Get more information NOW about the big-yardage Manitowoc that best suits your business.

Manitowoc

SHOVELS 1¼-6 YDS. · CRANES 25-125 TONS

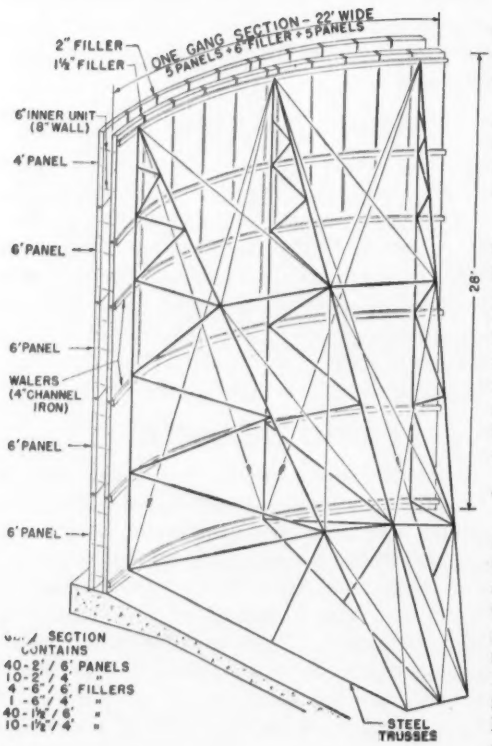
MANITOWOC ENGINEERING CORP. PASTE ON POSTAL CARD
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WISCONSIN Dept. CM.

Send complete information on:
- ☐ 1¼-yd. ☐ 1½-yd. ☐ 2-yd.
- ☐ 2½-yd. ☐ 3-yd. Trench Hoe
- ☐ Other excavators to 6-yds.
- ☐ Cranes from 25 tons to 125 tons

NAME.....
TITLE.....
COMPANY.....
STREET.....
CITY..... STATE.....

New use for Symons Steel-Plys in gang forming...

28' CIRCULAR WALLS GANGED FOR SEWAGE PLANT



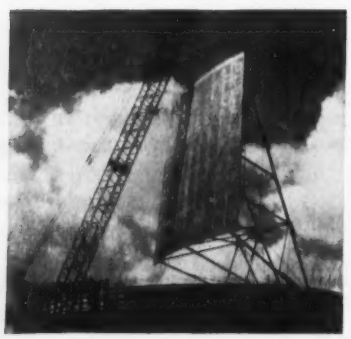
2,300 square feet of forms on inside ganged section stripped and reset by crane in 3½ hours.

8 men in less than 8 hours erected 2,300 square feet of forms and scaffolding on outside plus pouring the concrete.

Friebel & Hartman, Shelby, Ohio contractor ganged Symons Steel-Ply Forms on the Mansfield, Ohio Sewage Treatment Plant. The project consisted of four digestors, each 80 feet in diameter and 28 feet in height and 8 inches thick with no horizontal joints.

4 Ton Sections

Four ganged sections were used—each 22 feet wide and 28 feet high. This allowed pouring ¼ of a tank at a time. Each ganged unit consisted of four rows of 6' Symons Forms and one row of 4' forms to make the 28' height. Three trusses were used to brace each ganged section. A ¾ yard Lorain with an 80' boom handled the sections.



One Pour Every 4 Working Days

What is the Friebel & Hartman verdict on using this method of pouring: "Ganged forming enabled us to place our concrete efficiently and vibrate properly, held bracing costs to a minimum, allowed us one pour every four working days and gave us some very low erection costs."

Complete story on the Ohio Sewage Treatment Plant will be sent FREE upon request. Symons Forms may be rented with purchase option.

Symons CLAMP & MFG. CO.

4255 DIVERSEY AVENUE DEPT. B-0 CHICAGO 39, ILLINOIS

Warehouses throughout the U.S.A.

MORE **SAVINGS** FROM **SYMONS**

JOB TALK . . .

continued from page 21

Crews stripped the forms by dropping the shores a few inches by means of the adjustable screws on the scaffolding. Then they moved the units along the skids with the help of hand winches anchored to the floor slab. It took about 40 man-hours to reposition a skid unit. They reused each unit three times.

The drop heads and the areas between them in line with the columns were formed on top of single Waco scaffold towers. They moved these towers from bay to bay on a pair of three-wheel dollies.

Separating Sheetpiling

Pulling sheetpiling in sections instead of one at a time saves time in the field, but separating the pieces for later reuse can prove awkward.

Here's how master mechanic John Luhrs handles the problem at the Yonkers, N. Y., yard of Poirier & McLane Corp. His crew sets a No. 7 McKiernan-Terry piledriving hammer on top of one section and stretches a cable from the hammer to the other end of the same section. They tighten the cable with a ½-ton comealong to hold the hammer securely in place on the section. A steel bracket welded to the hammer wraps around the adjacent section and guides the hammer.

Then they place a dozer so its blade holds the other sections in place while the hammer drives a section of sheetpiling along the interlock until it is free.

B.F.Goodrich

Copter hop over the new Niagara

Ride in the Bell Ranger and see how B.F.Goodrich tires help build the world's mightiest power project

SOON THE CHURNING WATERS of the Niagara River will be generating more electrical power than ever—over two million kilowatts, enough to light a city the size of Chicago.

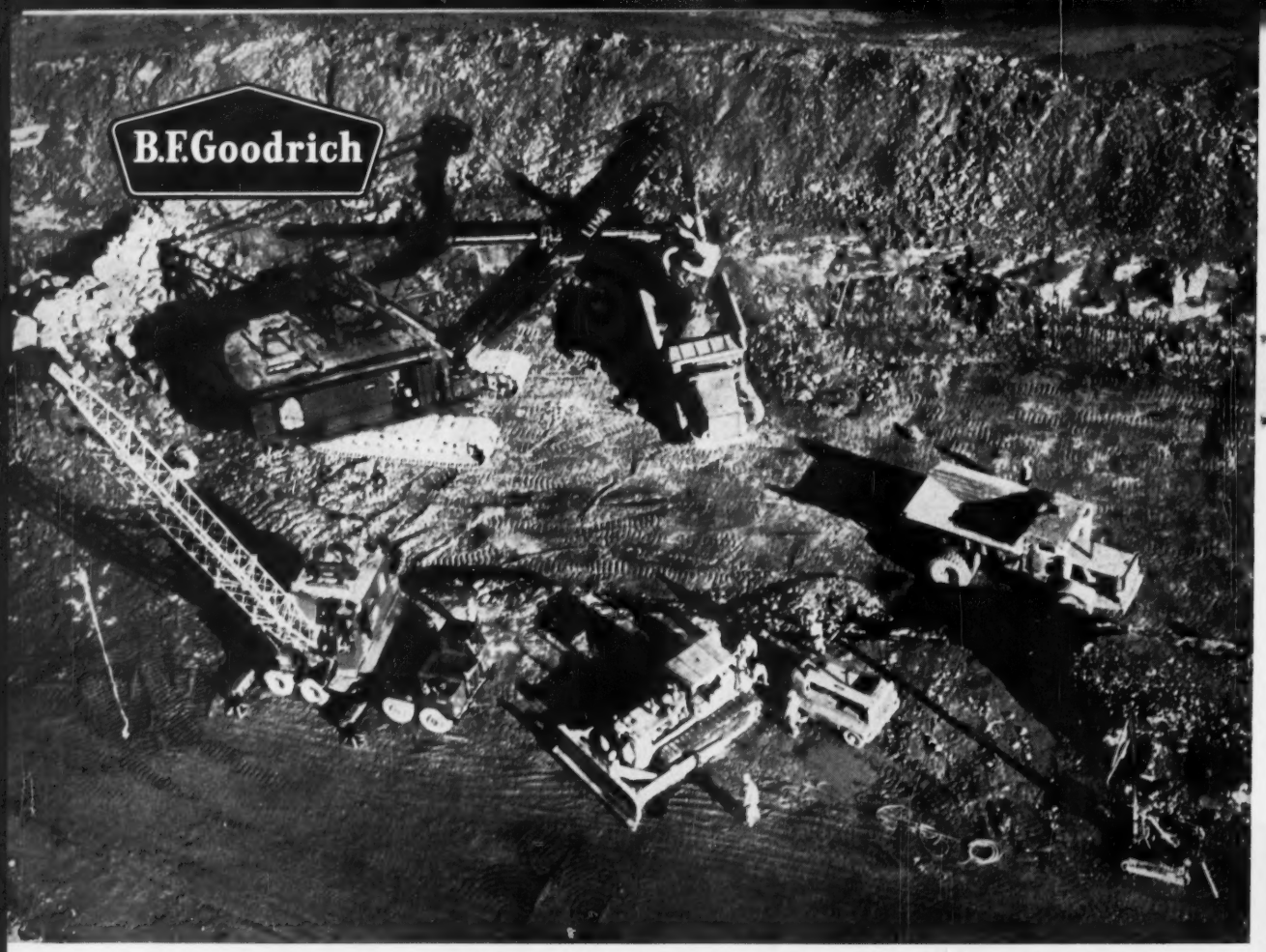
More electricity at lower cost is what we'll get from the $720-million Niagara Power Project, one of the biggest peace-time construction jobs in our history.

Already trucks and other earth-movers have shouldered their loads more than 800,000 times—enough trips to take them ten times around the world.

To cope with the challenges of this and other tasks, Merritt-Chapman & Scott Corporation, largest contractor on the project, uses B.F.Goodrich tires and other products.

NOW WE'RE AT 3,000 FEET. Below us is the entire Niagara Project. At the upper right are the Falls. At upper left, 2½ miles above the Falls, is the Intake Area. Here water will be diverted from the Niagara River into 2 giant covered conduits, each of which is as wide as a 4-lane highway and 5 times higher than the Holland Tunnel. These conduits take the water into the vast Storage Reservoir. From there it moves to the new Niagara Generating Plant, where it plummets down to drive 13 generators. Turn the page and learn how this mammoth job is progressing with the aid of B.F.Goodrich tires.

This B.F.Goodrich report continues ▶



SWOOPING DOWN we come over the conduit area that will carry water from the Niagara River to the new reservoir. Excavations for the 46′-wide covered conduits are 110′ x 50′. The trucks below us, hauling away rocks, are equipped with B.F.Goodrich tires. Altogether, more than 2100 B.F.Goodrich tires—on dump trucks, loaders, graders and other equipment—work 'round the clock, six days a week, rolling over rock-strewn Niagara excavation sites.

See how 2100 B.F.Goodrich tires

B.F.GOODRICH ROCK SERVICE TIRES have run up amazing service records at Niagara—over 5,000 hours in some cases! The new B.F.Goodrich Cut Protected tread compound is outstandingly successful at withstanding cutting and chipping from abrasive Niagara rock. Massive double-chevron Rock Service cleats give extra traction in forward or reverse. And because of the B.F.Goodrich Flex-Rite Nylon cord body, Rock Service tires are almost immune to heat blowouts and flex breaks. Result: you get more original-tread hours of service, more retreadable tires.

TO GIVE CONTRACTORS what they need *when* they need it, B.F.Goodrich built a warehouse near the Niagara project. A complete line of B.F.Goodrich tires is stored, ready for every emergency. At the B.F.Goodrich Tire Service Building on the job site, a crew of trained tire maintenance men works in shifts, 'round the clock.

IT'S AN EMERGENCY, and the B.F.Goodrich Tire Service Man is there. He's trained to handle any type tire on any type equipment. He has at his disposal all the latest power tools, such as hydraulic cranes, pneumatic wrenches, bead jacks. Background: 13 penstocks at Niagara Generating Plant will direct torrents of water into giant turbines. Penstocks are 462 feet long.

are helping men harness Niagara

From the beginning of work on the Niagara Power Project, B.F.Goodrich on-the-scene specialists have helped determine exactly the right B.F.Goodrich product for each particular job. In addition to Rock Service tires (now available in the new Cut Protected compound), B.F.Goodrich Rock Logger, Tractor Grader, All-Purpose, Mud-Snow and Power Express tires are at work.

B.F.Goodrich hose feeds air to machines drilling dynamite holes. B.F.Goodrich rain suits, gloves and footwear protect hundreds of construction workers.

B.F.Goodrich conveyor belts will carry materials for 1,300,000 cubic yards of concrete, total required for the entire generating plant. And helping to keep the whole project humming are special B.F.Goodrich maintenance and service facilities—all part of the new B.F.Goodrich Unified Contractor Program.

No matter what your off-the-road job, B.F.Goodrich is ready to serve you, and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Company, Akron 18, Ohio.*

SPECIFY B.F.Goodrich Tubeless or tube-type tires when ordering new equipment.

Smileage!

B.F.Goodrich *off-the-road tires*

Dragline gets inspection from Keith Hutchison, Greer vice president and technical director, Phil Owen and Chuck Daub (l. to r.). Owen and Daub are Standard Oil lubrication specialists who render the school technical assistance on lubrication problems. Both have engineering degrees and both have completed Standard's Sales Engineering School. Daub has ten, Owen five years of field experience serving commercial customers.

Standard Oil helps this school teach men how to keep a construction job going

Hutchison, Owen and instructor John Rolando watch student load 17-yard off-highway dirt hauler, one of school's 26 units.

Greer Excavating and Mechanics School has learned one of the lessons it teaches—how to keep equipment in service

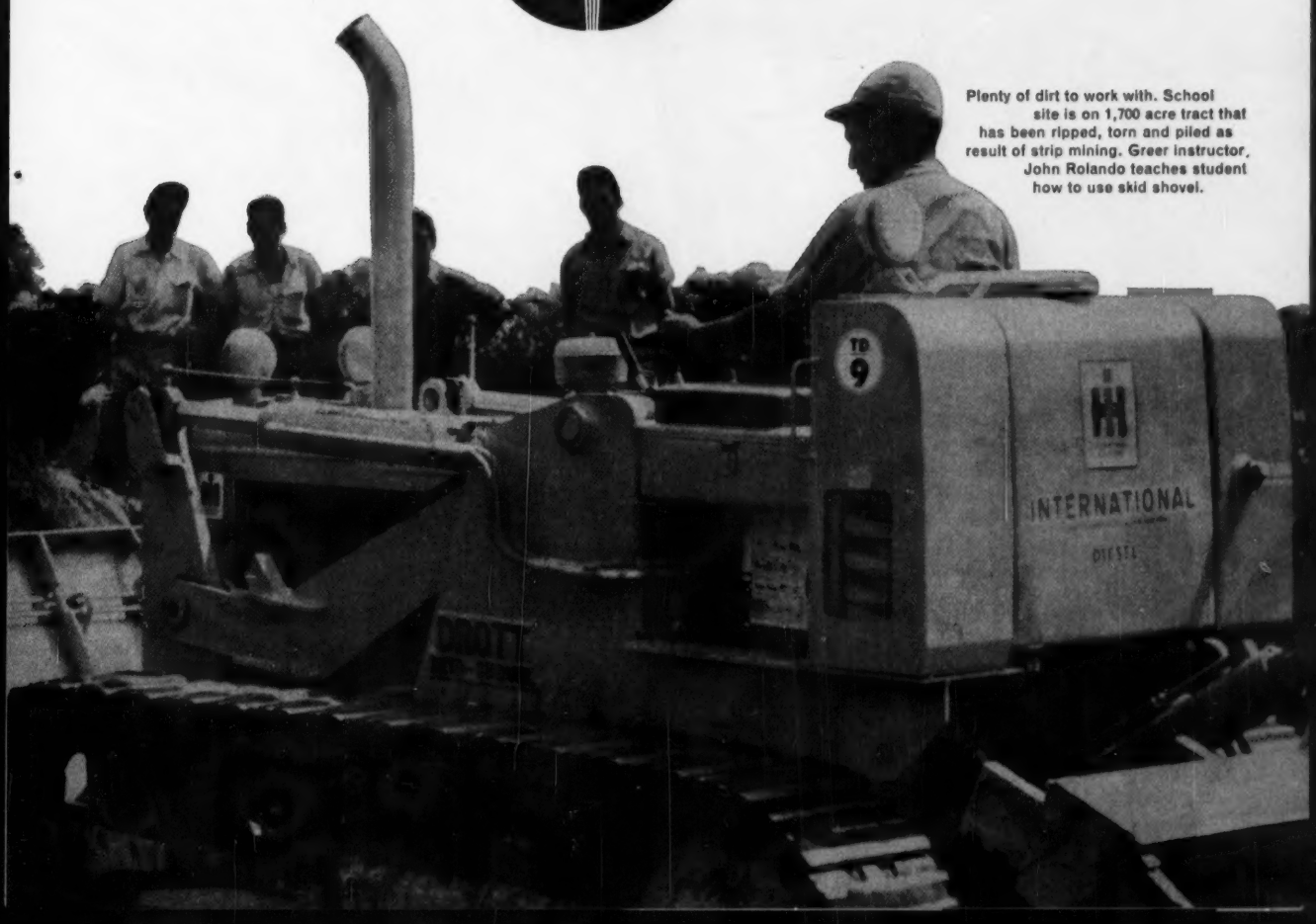
Situation: Time is money at Greer Excavating and Mechanics School, Braidwood, Illinois. The school promises its students hours of experience operating equipment. It teaches them how to maintain and service the machinery they work with. It also teaches the men how important it is to do the job right and on time.

Up to 70 students, guided by nine experienced instructors, work 26 pieces of equipment almost every daylight hour, seven days a week, winter and summer. Bulldozers, scrapers, trucks, shovels and draglines *must stay in service* in spite of the rugged treatment they get.

What was done: From the first day of school more than three years ago, Greer Institute's equipment has been serviced exclusively with Standard Oil gasoline, diesel fuel, motor oil and greases. No unit has ever been down due to lubrication failure or because of slow delivery. How come? Because Phil Owen, an experienced Standard Oil lubrication specialist from Joliet, just 20 miles from the school, makes regular calls to check out any lubrication problem. From Wilmington, only 5 miles away, Standard Oil agent R. J. Kavanagh makes deliveries of gasoline, diesel fuel, lube oil and grease as often as every other day. The school never needs to telephone for service.

What you can do: To get this kind of service call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write, **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*



Plenty of dirt to work with. School site is on 1,700 acre tract that has been ripped, torn and piled as result of strip mining. Greer instructor, John Rolando teaches student how to use skid shovel.

IT'S NEW!...
AMERICAN'S EXCLUSIVE!

"Other machines always 'rock' when the going gets tough," reports Dominick Russo, foreman for Peter Lametti Const. Co. "But with American's *Positive-Pressure* Backhoe, you don't have to keep chopping . . . less ground jarring means fewer cave-ins . . . you get more actual digging done . . . it really grinds through the hard stuff. No other machine can match its output."

Ingenious Invention Means Faster Digging in Toughest Going

An exclusive backhoe attachment that enables the operator to use almost the entire weight of the machine when digging through rocky soil or the toughest ground, has just been introduced by American Hoist.

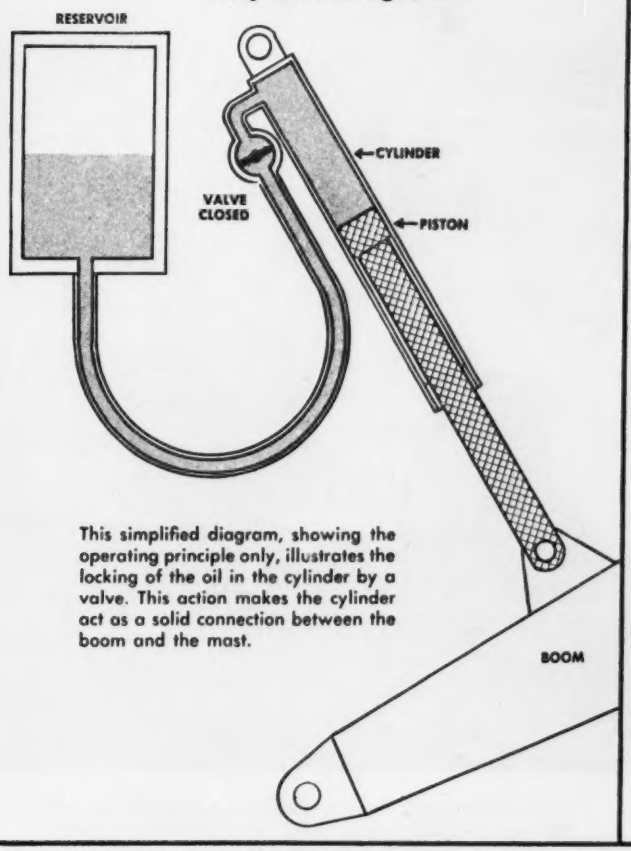
Its operation is fully automatic and is based on the engineering principle that hydraulic fluid is practically non-compressible. American's *exclusive* Positive-Pressure Backhoe provides a solid connection between the boom and the mast. Thus, when penetration is difficult, and the boom is not permitted to raise, much of the entire machine weight is used to force the dipper teeth into the rock or ground.

. SENSATIONAL!

Positive-Pressure BACKHOE

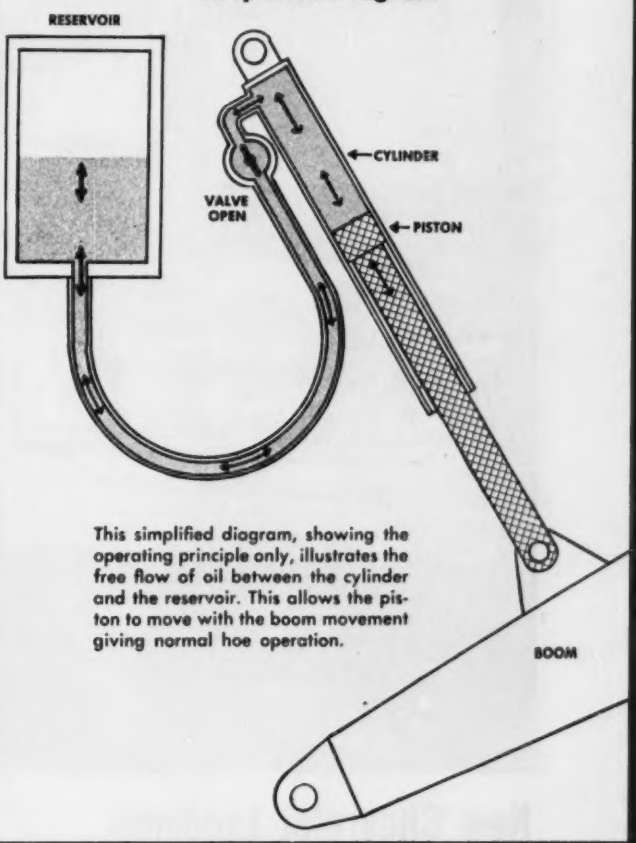
PAT. PEND.

Simplified Diagram



This simplified diagram, showing the operating principle only, illustrates the locking of the oil in the cylinder by a valve. This action makes the cylinder act as a solid connection between the boom and the mast.

Simplified Diagram



This simplified diagram, showing the operating principle only, illustrates the free flow of oil between the cylinder and the reservoir. This allows the piston to move with the boom movement giving normal hoe operation.

When operator starts his inhaul, hoist line goes slack, closing hydraulic valve, locking oil in cylinder. Cylinder becomes solid connection between boom and mast. To force boom upward, almost entire weight of machine has to be raised off the ground.

When hoist line is taut, valve automatically opens, permitting free flow of oil from cylinder to reservoir. Thus free moving piston permits ordinary hoe operation. The unit is fully automatic and no special operating techniques are required.

Engineers and contractors have acclaimed this attachment (available on all sizes of American backhoes) as the greatest backhoe advancement in years.

Write today for complete information on how American's Positive-Pressure Backhoe can pile up extra profits for you, or contact your American distributor.

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

EXCAVATORS-CRANES to 2 yds.-60 tons
LOCOMOTIVE CRANES to 130 tons

DERRICKS-HOISTS to 800 tons
REVOLVER CRANES to 400 tons

WORTH MORE BECAUSE THEY

New Chevrolet tandems do bigger day's work!

With a tough new build that includes revolutionary Torsion-Spring Ride and the strongest rear suspension yet, Chevrolet's new tandems are equipped to do more profit-producing work per day than ever before. They're built to move mountainous payloads faster and more efficiently over rough routes, on or off the road.

Chevrolet's new M70 tandems – available on 157-, 175- and 193-inch wheelbases – are built to work more and earn more on big-tonnage runs, with extra load capacity and sensational new Torsion-Spring Ride. It's a ride that takes the rough edges off the biggest of bumps, easing the strain on driver, cargo and chassis components alike. You get a new kind of smooth-going *roadability* that pays off out on the job by assuring more ton miles of operation per day . . . higher safe speeds for extra trips and bigger profits.

Underlying this new roadability is Chevrolet's tough new torsion-spring independent front suspension system – available in high 7,000-lb. and 9,000-lb.* capacities. Here, rugged cast and forged steel control arms guide each front wheel precisely, and heavy-duty spherical joints and massive pivot bearings keep friction low. And for maximum off-the-road handling ease power steering is standard in all tandem models.

New Eaton-Hendrickson Rear Suspension

Back under the load is a totally new tandem rear suspension featuring two big 16,000-lb. axles, with rugged walking beams and torque arms to keep them tracking true. New, direct single-line drive – simple yet rugged in design – features a new inter-axle differential that divides the driving load equally at all times for less wear and long, trouble-free life. And you get the best kind of big-truck *power,* too. Chevy's famous Workmaster V8, with 230 h.p., 335 ft.-lbs. of torque, 4-barrel carburetion and a complete lineup of premium heavy-duty features, is standard in all tandem models. **Optional at extra cost.*

WORK MORE! 1960 CHEVROLET STURDI-BILT TRUCKS

New Chevy pickups pay off in new ways

Chevy's new way with work makes short work of meanest hauling jobs – gets them out of the way faster and easier, more economically and profitably. Pick the pickup that suits your needs from Chevy's big 11-model lineup that includes stylish Fleetsides, handy Stepsides and new lower priced 4-Wheel-Drive models.

The trim, low lines of Chevy's 1960 pickups only hint at the tremendous difference in store for you. Their totally new chassis design is engineered from the road up to deliver payload performance like you've never known before. For example, Chevrolet's new torsion-spring independent front suspension and new frictionless rear coil springs give you the smoothest truck ride you've ever experienced whether loaded down or running empty.

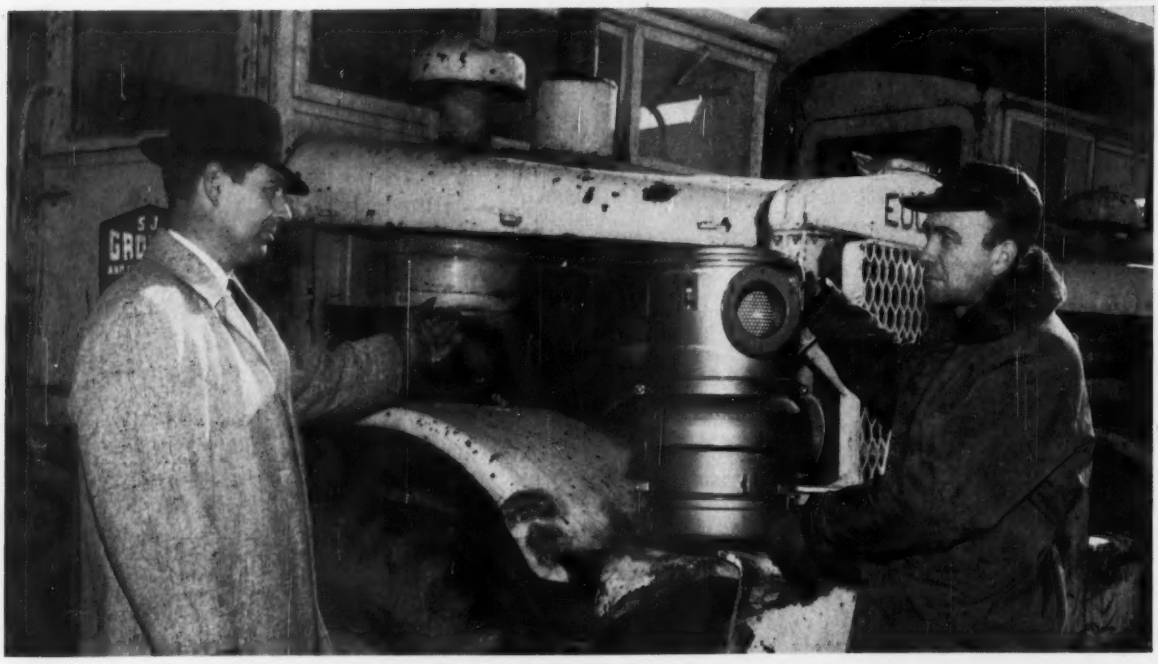
And the new drop-center frame construction *lowers Chevrolet's over-all height*. This results in easier cargo handling, easier cab entry and exit. And it means a lower center of gravity which, teamed up with Chevy's advanced suspension, produces new stability on the road. There's new sure, easy handling that pays off in higher safe speeds, shorter trip times, more work and more profit per day!

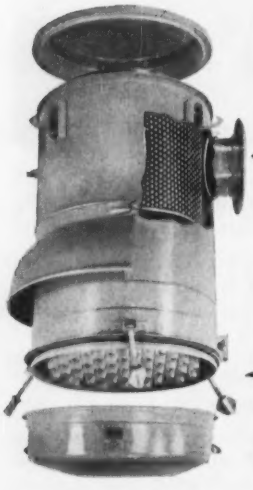
All this and much more – including the latest in economical V8 or 6-cylinder power and new cab comfort – is yours in a '60 Chevy pickup. And new models in every weight class come equally well-equipped for bigger profit hauling! Get full details from your Chevy dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS CHEVROLET

"At S. J. Groves & Sons, we've installed Donaclones on 275 engines so far."

Dave Armstrong, Maintenance Superintendent





Only 2% of dust reaches Duralife paper filter!

Embossing and pleating provide maximum filtration area. Controlled porosity gives 99.9% dust removal.

98% of dust removed here!

Cluster of Donaclone tubes make up highly-efficient primary centrifugal cleaning stage. Dust is ejected into dust cup for easy servicing.

Paper filters filter best, but it takes efficient pre-cleaning to make them practical from the servicing viewpoint. Note above that Donaclone tubes remove 98% of the dust. Only 2% reaches the Duralife filter, greatly increasing service life.

"Savings in service time and oil, and higher cleaning efficiency, were main factors in our choice."

World-famous S. J. Groves & Sons Company, is one of many contracting firms who have installed Donaclones on much of their heavy equipment. During the changeover to Donaclones, priority was given to machines which operate in heavy dust, where Donaclone efficiency and service savings are most marked.

Donaclones are the dominant choice, not only among heavy construction contractors, but also among engine and equipment manufacturers. Nearly all leading builders have shifted or are in the process of converting to Donaclone air cleaners.

Donaclones are 4 ways better. Their 99.9% cleaning efficiency is from 10 to 20 times better than oil-washed types, increasing engine life far beyond what is now considered normal and satisfactory. They use no oil, eliminate messy servicing and cost of oil, too! Servicing time is cut to a fraction of that previously required, and constant, low operating restriction saves fuel.

Add years to the life of your equipment! Convert to Donaclone protection now. Write or wire for name of nearest distributor.

Donaldson
COMPANY, INC.
666 Pelham Blvd.
St. Paul 14, Minn.

Donaclone
DUO-DRY
AIR CLEANERS

The Chase Manhattan Bank Building

A BETHLEHEM STEEL REPORT ON ONE OF THE SIGNIFICANT STRUCTURES OF OUR TIME

BETHLEHEM STEEL

Architect: Skidmore, Owings & Merrill; consulting foundation engineers: Moran, Proctor, Mueser & Rutledge; consulting structural engineers: Weiskopf & Pickworth; consulting mechanical engineers: Jaros, Baum & Bolles; consulting electrical engineers: Meyer, Strong & Jones; general contractor: Turner Construction Company.

"Like a shaft of light..."

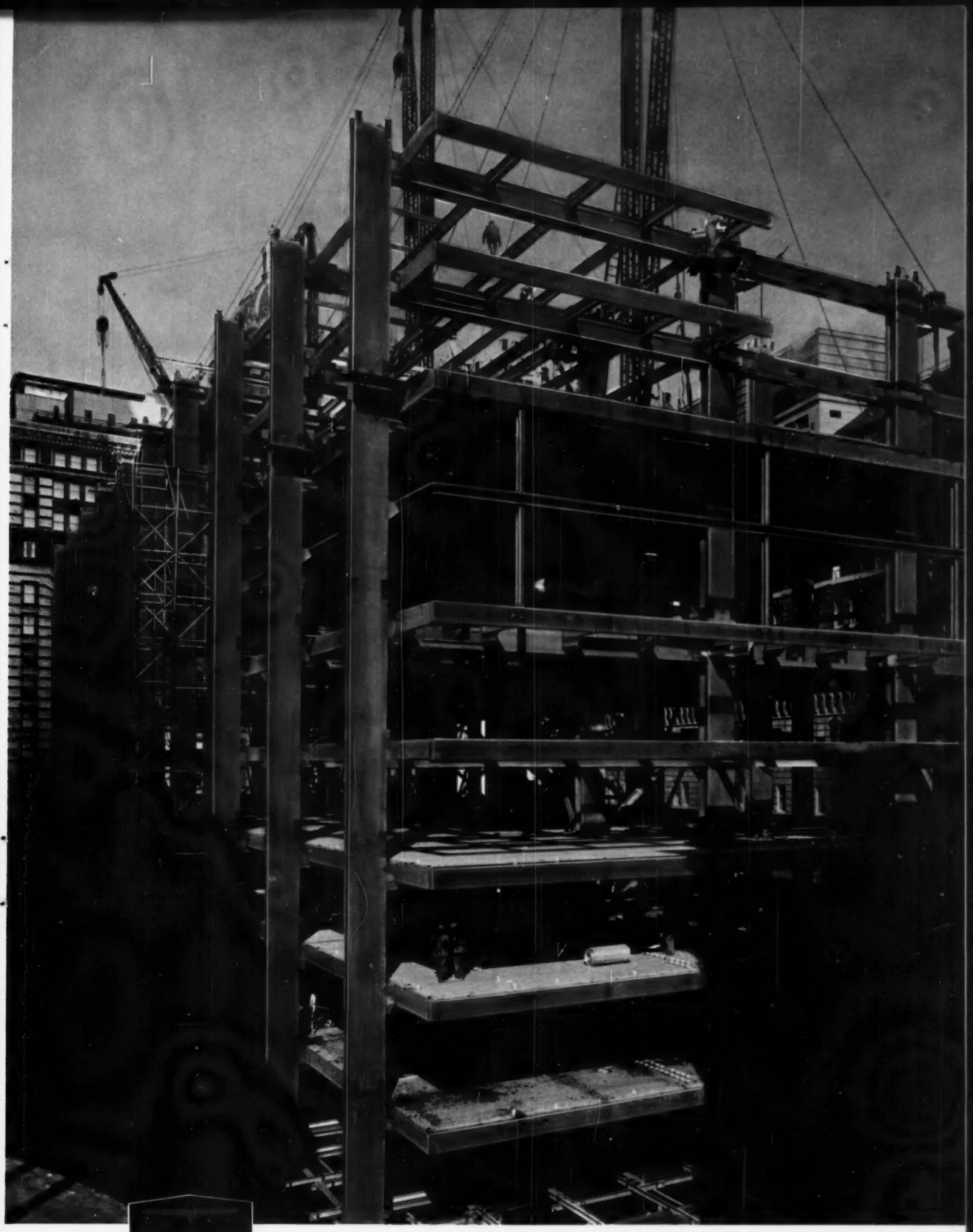
This apt phrase was used by an architectural journal in describing the design of the new headquarters of The Chase Manhattan Bank. Its lofty tower of glass and metal will glow amidst the somber facades of lower Manhattan. And, occupying only about a third of the 2½-acre site, it brings sunlight and air and spaciousness to the dark canyons of Wall Street.

Fifteen thousand employees will occupy the building, which rises sixty stories into the air, and extends five floors below ground level. Gross floor area is more than 2.3 million sq ft. The tower rises 810 ft without setbacks, and is approximately 281 by 107 ft in plan. It required approximately 53,000 tons of structural steel, fabricated and erected by Bethlehem. Nearly 5,000 tons of this total, plus some 1,100 tons of sheet piling, were required for the substructures alone.

BETHLEHEM STEEL

The column sections, up to 36 ft long and up to 52 tons in weight, were fabricated at Bethlehem's Pottstown Works. Made from heavy plate material, the sections' outside dimensions are uniform up the entire 810-ft height of the structure.

This project marked the first time that permanent floor steel was used as a horizontal strut system, or crosslot bracing, replacing the usual temporary bracing of cofferdams. The steel was erected downward from grade. As each level was placed and jacked to brace the outer walls, the contractors (The Foundation Co., George M. Brewster & Son., Inc., and Joseph Miele Construction Co., Inc.) excavated to just below another level, allowing more steel to be erected. This process was followed for five subsurface levels, to a depth of 80 ft.



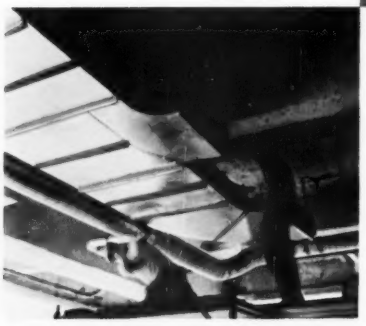
BETHLEHEM STEEL

In addition to fabricated structural steel, Bethlehem products used in the Chase Manhattan Building include high-strength structural bolts, sheet piling, concrete reinforcing bars, and steel pipe. Bethlehem wire rope and strand were used for rigging the guy derricks. In addition, manufacturers used Bethlehem products in fabricating the steel flooring, wall partitions, ductwork, and miscellaneous ironwork.

Steel decking, made by a Bethlehem sheet customer, was used throughout the building. It was laid quickly and economically; no need for forms. Electrical raceways provide flexibility for the huge open floor areas. Movable steel wall partitions have been designed by the architects and fabricated for use in this building.

An ironworker tightens Bethlehem high-strength structural bolts, used for all field connections. Bolting is faster, quieter, and safer than riveting and makes tighter joints.

Some 1,500 tons of Bethlehem electric resistance-weld and continuous butt-weld steel pipe were used for the water lines of the heating and air-conditioning system.



The 9,000-ton-capacity air-conditioning system is believed to be the largest ever installed in a commercial office building. The ductwork shown here was made from Bethcon, continuously galvanized steel sheets.

Bethlehem Products for Construction

Structural shapes; a full line of industrial fasteners; concrete reinforcing bars and specialty products; Bethlehem Slabform for poured concrete floors and roofs; wire rope, strand, and elevator cable; open-web joists; steel pipe in all diameters; sheet and H-piling; galvanized steel sheets; hollow drill steel; and a complete range of highway construction products.

Bethlehem Steel Company, Bethlehem, Pa.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

PUBLICATIONS DEPARTMENT C4
BETHLEHEM STEEL COMPANY,
BETHLEHEM, PA.

Send me literature on:

- ☐ Structural Steel
- ☐ High-Strength Bolts
- ☐ Open-Web Joists
- ☐ Pipe
- ☐ Piling
- ☐ Slabform
- ☐ Wire Rope

Name _____

Address _____

_____

WIN MORE STEEL SETTING BIDS!

put the EARNING POWER of a UNIT on your *lift* jobs

This 20 ton UNIT Model 1520T truck crane is setting steel for a power line atop Mt. Frances in Utah.

How many steel erection jobs like this have you lost because of the wrong type of equipment? To win more contracts of this nature you need a truck crane that can move in fast, yet have the reach and power to handle heavy beams at maximum heights.

UNIT TRUCK CRANES offer *true* mobility — road speeds up to 42 MPH — power and traction to meet the roughest off-the-road conditions. Power flows in a direct line to the tandem rear axles — maintains balance and uniform braking action on all rear wheels.

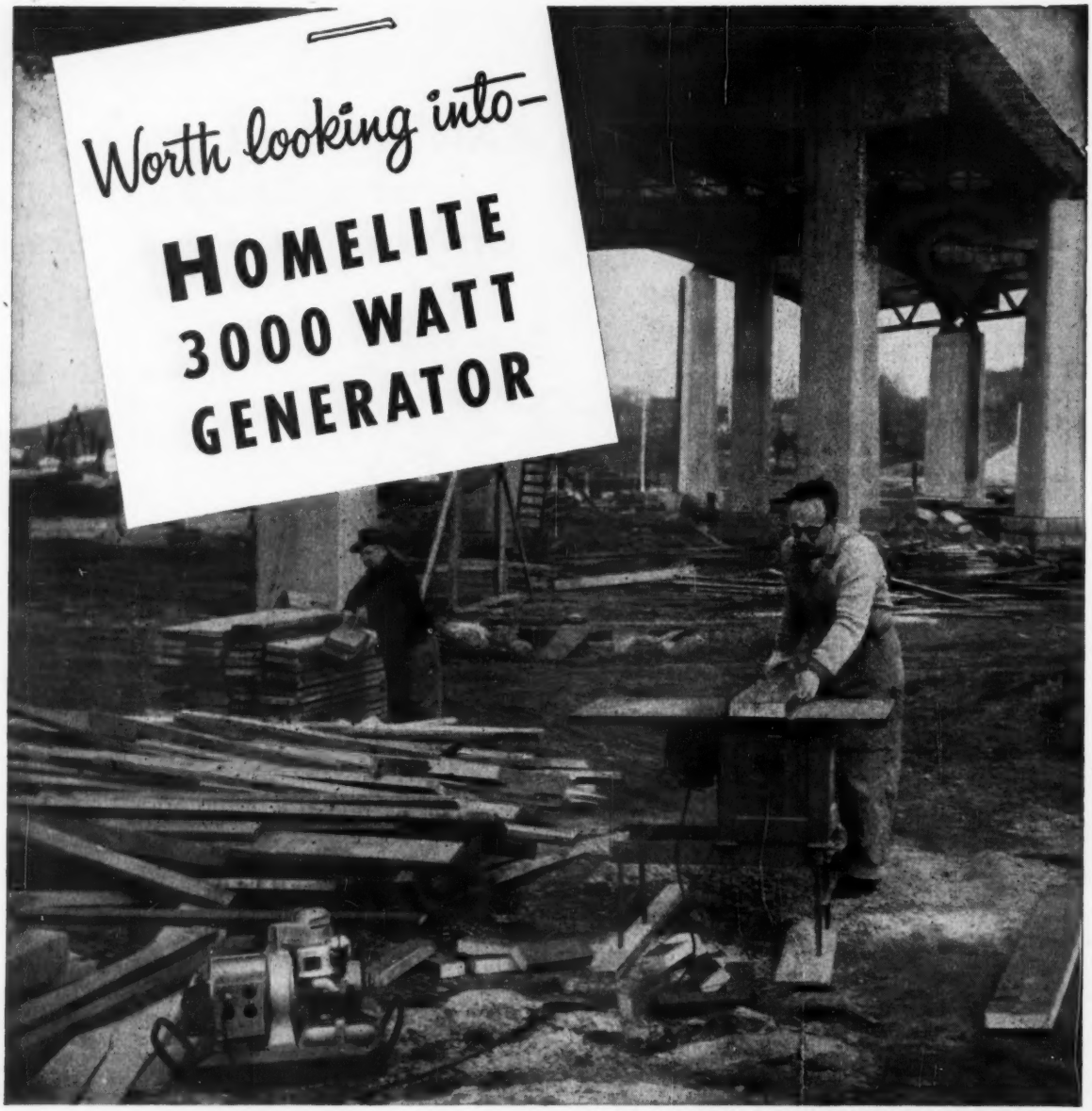
UNIT TRUCK CRANES put a wide range of power, plus precise control at your fingertips. No other cranes have a one-piece, cast gear case. This unique feature gives you perfect, compact machinery alignment for the most efficient performance. Double disc clutches provide the smoothest operation — are completely interchangeable. New oversize, ventilated brakes give you precise, accurate control for spotting loads. Independent boom hoist permits power raising and controlled lowering of boom at high speeds.

UNIT TRUCK CRANES are easy to operate and maintain. The roomy, Full Vision cab gives you an unrestricted, 360° view; has ample head room and large, super-safe, heat tempered glass windows. Sliding side panels and wide hood covers give spacious access to the crane motor and clutches.

UNIT TRUCK CRANES are built in five size ranges — 10, 15, 20, 30, and 35-40 tons — to handle most any lift job. Convertibility to all excavator applications brings you a plus value. Your UNIT dealer has full information on every model — and the famous UNIT crawler-mounted machines, too. Call him soon.

SHOVELS ½ to ¾ YDS.
HOES ½ to ¾ YDS.
CRANES 5½ to 40 TONS
DRAGLINES ½ to ¾ YDS.

UNIT
CRANE & [illegible] CORP.
6305 W. Burnham St.
Milwaukee, Wisconsin



USED BY MEN WHO BUY EQUIPMENT FOR WHAT IT SAVES

More Power...Easier Operation...Less Maintenance

We put it squarely up to builders and contractors all over the country. Homelite engineers wanted to know what you need in a lightweight gasoline engine driven generator. And here's the Homelite solution . . . a brand-new unit that weighs only 140 pounds and gives you full 3000 watts. It has the extra power to run extra tools and floodlights. And you don't have to operate rheostats or other controls. The voltage is automatically controlled within four per cent from no load to full load. This new Homelite model 8A is completely free from trouble makers. No DC brushes. No commutator. No DC windings on armature. See it in action, right away. Two models are available . . . 115 volt and 115/230 volt, both 60 cycle, AC.

Homelite factory branches are located throughout the country. Your nearest one is as close as your phone. Call them or write for convincing demonstration or rapid service in any way.

HOMELITE
CARRYABLE
GENERATORS PUMPS • CHAIN SAWS BLOWERS

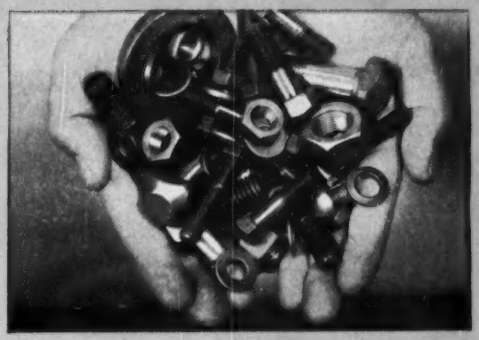
HOMELITE • A DIVISION OF TEXTRON INC., 1002 RIVERDALE AVE., PORT CHESTER, N.Y.
In Canada — Terry Machinery Co., Ltd.

SPECIAL REPORT TO CATERPILLAR OWNERS:

CAT CATERPILLAR

Parts you can trust
...cost less per hour

CAT ALL-PURPOSE BOLTS AND NUTS ARE STRONGER... HOLD LONGER... GRIP BETTER

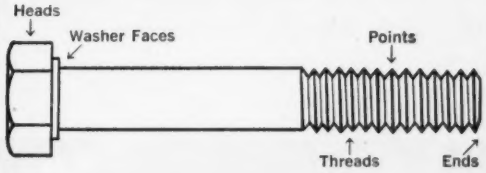


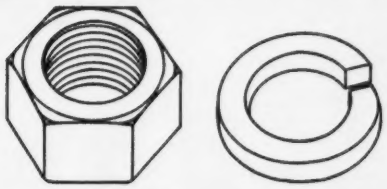
Ever twist a head off a bolt because it wasn't *strong* enough . . . or scrape your knuckle when your wrench "rounded off" the head because it wasn't *hard* enough? It's not likely to happen if you use Cat all-purpose bolts and nuts. They're highest quality in every way. For example, Cat bolts exceed Grade 6 in all requirements as rated by the Society of Automotive Engineers. Grade 5 is the average rating of bolts used in other earthmoving equipment.

WHAT GRADE OF BOLTS DO YOU USE?

Here's what's normally stocked at...	Hardware Stores, Automotive Outlets	Industrial Supply Houses, Other Mfr. Outlets	Special Order Only	Caterpillar Dealers
SAE	Grade 0-3	Grade 5	Grade 6	Exceeds Grade 6
Minimum Tensile Strength (Breaking point)	55,000-110,000 PSI	105,000-120,000 PSI	133,000-140,000 PSI	142,000 PSI
Hardness Rockwell Rating	RC 0-28	RC 19-32	RC 28-36	RC 30-38

If you need tougher, stronger hardware—get Cat all-purpose bolts and nuts. You can count on them to do a better job longer because they're stronger and harder than others.





HERE ARE OTHER CAT BOLT BONUSES YOU GET. *Heads* are higher and full size—easy to get wrenches on. *Flats* are hard and parallel—corners don't round off, are easy to grip. *Threads* are rounded at the roots and free from laps and burrs. *Points* are smooth and uniform. *Ends* are precisely rounded or chamfered—cross-threading doesn't occur. *Washer faces* are flat and have uniform thicknesses. *Heads and threads* are concentric to shaft—heads and nuts fit flush.

NUTS AND LOCK WASHERS are matched to every size bolt to give complete top-quality fasteners, too. Nut threads resist stripping. Corners do not round. Clean, smooth-fitting threads make installation fast and easy. Lock washers have smooth surfaces for maximum wear and strength.

When you need the best bolts and nuts to keep your machinery and other equipment together, see your Caterpillar Dealer. He has a large selection.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

SERVICE TIP: Get your free copy of Caterpillar's bolts and nuts reference booklet at your Caterpillar Dealer today. It has the sizes, threads and part numbers listed for quick, easy ordering. Before buying any hardware, check Cat prices first.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

275 tons per hour-

to the strictest specifications from this "SERIES A" Batch Type Asphalt Plant

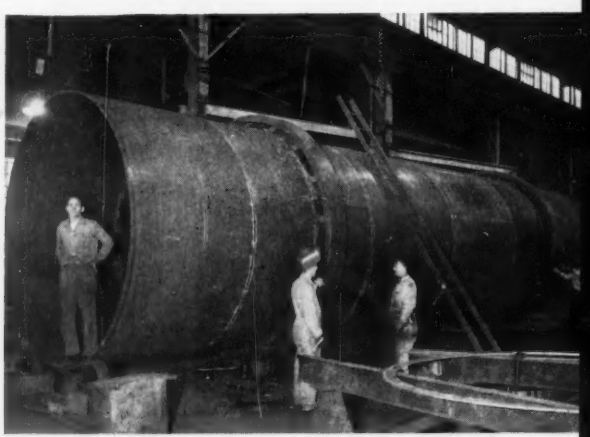
• This recently installed H&B "Series A" batch type asphalt plant has been producing to and in excess of its rated capacity of 250-275 tons per hour.

George F. Patterson, of Trimount Bituminous Products Co., Everett, Mass., owner of the plant, says: "Our experience with the T-80 plant definitely substantiates your manufacturer's rating of 250-275 tons per hour. I would add that at peak hours on certain mixes we have exceeded your rating by 15%-20%."

Basically, Series "A" plants are much the same as our Type "T" plants which have established such outstanding production records. To the proven design of the sturdy Type "T-A" plant, H & B engineers have adapted many improvements and refinements into the current Type T Series "B" plants—a few of which are listed and briefly described on the opposite page. Series "B" plants are available in six sizes, with batch capacities from 2,000 to 8,000 lbs. For complete information see your H & B distributor or write direct.

Dryer Drum 40′ long 112″ diameter

This view shows the dryer drum in construction, with the trunnion rings being applied. This unit is typical of the massive construction of this plant. To our knowledge, this is the only full and completely balanced 8,000 lb. plant in existence.



HETHERINGTON & BERNER INC., INDIANAPOLIS 7, INDIANA

Export Dept., 205 W. Wacker Drive, Chicago 6, Ill., Cable Address "PANMAKINA"

A few of the many IMPROVEMENTS and REFINEMENTS – that make this increased production possible – even to the strictest specifications

- NEW . . . *Screens*—New model Deister Screens, 3½ decks, balanced design, all sizing decks full area.
- NEW . . . *Larger Hot Elevator*—Increased capacity, with new type chains and buckets.
- NEW . . . *Larger Dryers*—All models offer larger dryers, with lifter flight modifications to allow better air flow and improve aggregate distribution.
- NEW . . . *Oil Burners*—Maxon—Low Pressure.
- NEW . . . *Dryer Feed Hood*—Sealed to eliminate air leaks. Also internal chute to return dust to drum and eliminate accumulation in hood.
- NEW . . . *Fugitive Dust System*—Ducts built into elevator casing with separate exhauster and individual controls on all ducts.
- NEW . . . *Tower Stability*—Less screen overhang means less vibration. On the large screens, a dynamic braking system eliminates tower sway when screen stops.
- NEW . . . *Relocated Dust Elevator*—On same side as hot elevator, so return from dust collector can be put into hot or dust elevator as desired, without use of conveyor.
- NEW . . . *Electric Control Center*—Integral part of tower structure, with permanent wiring for mixer, air compressor, cycle control on mixer.
- NEW . . . *Optional Reject Bin*—For oversize from screen, with chute mounted on aggregate bin. Discharge to back of tower at driveway.

A wholly owned subsidiary of AMERICAN HOIST & DERRICK CO.

BALANCE YOUR LOAD...
BALANCE YOUR SCHEDULES!
INTERNATIONAL SIX-WHEELERS
do it with even weight distribution, step-ahead power

Compact-design six-cylinder or V-8 INTERNATIONAL models give you the most advanced combination of engine and semi-automatic transmission in the business. There's perfect unit-to-job balance hilly country or flat. Husky, all-truck power to 345 cu. in. has the guts to pull out of a "hole" or pull ahead on the road. Select-O-Matic transmission (optional) tames every ounce of power for complete control and smooth application whatever the conditions. Shock-load to rear axle is virtually eliminated. Six-wheel models to 33,000 lbs. GVW.

When only a six-wheeler can do the job right, only INTERNATIONAL offers 84 ways to go!

INTERNATIONAL® TRUCKS WORLD'S MOST COMPLETE LINE

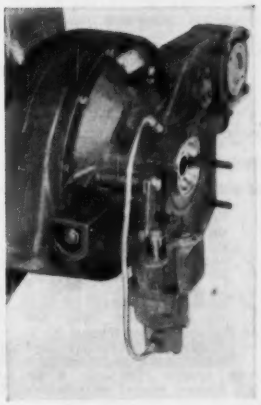
International Harvester Co., Chicago • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

Dependable! From reinforced cabs to extra-husky frames, V-8 powered INTERNATIONAL six-wheel trucks are quality built for fast-moving dependability. Rugged power trains including up to 549 cu. in. V-8 engines and standard differential lock-out are factory matched for heavy-duty use. Special truck pistons and rings cut oil consumption. Metered-flow water jacket evens engine temperature. Finish-honed replaceable exhaust valve guides and self-aligning hydraulic tappets further reduce nominal downtime. COE and conventional models to 65,000 lbs. GCW.

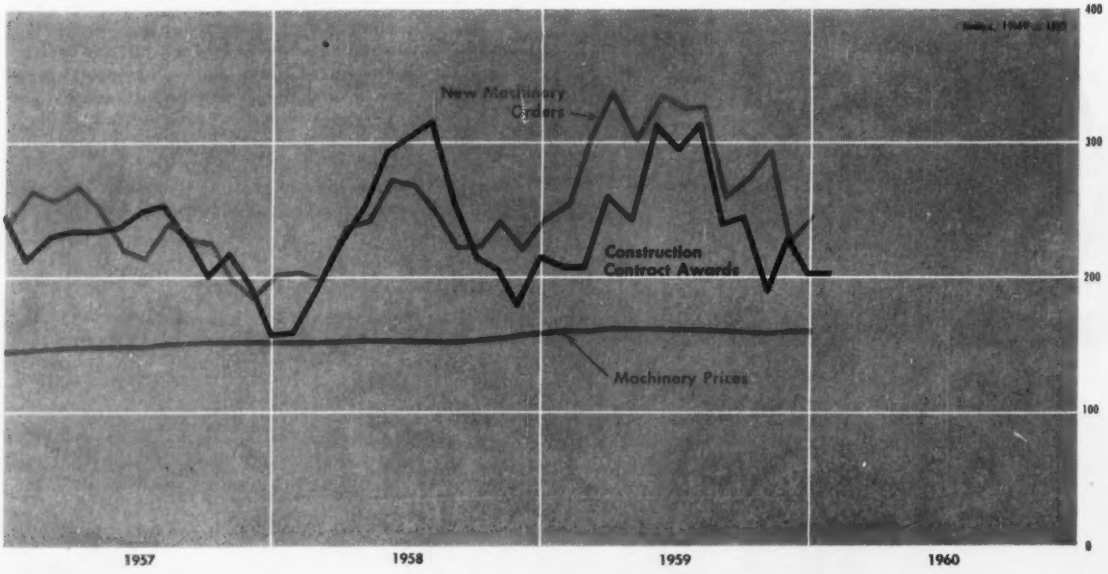
Tough! Rugged, six-wheel INTERNATIONAL transit-mix chassis are available with six-cylinder engine options offering up to 501 cu. in. displacement. Every pound-foot of engine torque is multiplied by an over-all gear reduction of over 100-to-1. The powerful result is dependable, smooth-working tandem performance that keeps heavy-duty payloads moving on schedule—cuts cost with reduced operating expense and downtime. 34,000 lb. tandems, 15,000 lb. front axles. Optional power steering—diesel engines to 175 hp.

Now increase payloads and working life with direct drive flywheel power take-off!

New INTERNATIONAL factory mounted option on heavy-duty "six" or V-8 engines eliminate power take-off at front end. Direct gear drive off flywheel gives you up to 75 hp. at output shaft. There are no belts to replace, no excessive parts to wear out . . . maintenance and downtime are kept to minimum.



Trends in the Machinery Market



Price Index

	DECEMBER 1959	MONTH AGO	YEAR AGO	% CHANGE 1958-1959
All Types of Equipment	172.9	172.9*	170.3	+ 1.5
Cranes; Draglines, Shovels	**170.5**	**170.5**	**168.3**	**+ 1.3**
Shovel, ½ cu yd	165.0	165.0	156.0	+ 5.8
Shovel, ¾ cu yd	173.9	173.9	173.3	+ 0.3
Shovel, 1-1½ cu yd	184.3	184.3	183.7	+ 0.3
Shovel, 2-2½ cu yd	164.7	164.7	158.8	+ 3.7
Shovel, 3-3½ cu yd	167.8	167.8	165.2	+ 1.6
Shovel, 6 cu yd	195.0	195.0	184.1	+ 5.9
Crane, truck mounted	166.2	166.2	168.8	— 1.6
Crane, tractor mounted	135.1	135.1	135.1	0
Bucket, clam shell	157.5	157.5	157.5	0
Bucket, dragline	169.3	169.3	189.7	—10.8
Scrapers and Graders	**165.8**	**165.7***	**159.6**	**+ 3.9**
Scraper, 4 Wheel, 8-10.5 cu yd	155.0	155.0	155.0	0
Scraper, 4 Wheel, 12-15 cu yd	156.8	156.8	154.4	+ 1.6
Scraper, 2 Wheel, 15-19.5 cu yd (a)	124.9	124.7*	126.2	— 1.0
Grader, heavy duty	172.6	172.6	164.2	+ 5.1
Grader, light & medium	171.1	171.1	161.2	+ 6.1
Tractors (non-farm, incl industrial)	**188.7**	**188.7***	**187.3**	**+ 0.7**
Wheel type, off-highway (a)	129.0	129.0	129.9	— 0.7
Crawler type, 50-74 dhp	193.6	193.6	188.8	+ 2.5
75-99 dhp	193.6	193.6*	191.9	+ 1.0
100-154 dhp	192.4	192.4	191.3	+ 0.6
155-200 dhp	201.3	201.3	201.3	0
Machinery, Tractor Mounted	**169.0**	**169.0**	**168.2**	**+ 0.5**
Dozer, cable controlled	154.4	154.4	154.4	0
Dozer, hydraulic controlled	186.6	186.6	186.6	0
Cable power control unit	151.4	151.4	150.0	+ 0.9
Loader, tractor shovel	162.5	162.5	161.0	+ 0.9
Specialized Machinery	**156.2**	**156.2***	**152.3**	**+ 2.6**
Ditcher	150.1	150.1*	156.6	— 4.2
Roller, tandem	220.2	220.2	198.6	+10.9
Roller, 3 wheel	174.9	174.9	162.5	+ 7.6
Ripper and rooter	150.5	150.5	143.3	+ 5.0
Dewatering pump, 10 M gph	110.3	110.3	112.0	— 1.6
Dewatering pump, 90 M gph	151.0	151.0	145.7	+ 3.6
Portable Air Compressors	**167.5**	**167.5**	**159.5**	**+ 5.0**
Contractor's Air Tools	**181.6**	**181.6**	**175.9**	**+ 3.2**
Mixers, Pavers, Spreaders	**157.5**	**157.3***	**151.4**	**+ 4.0**
Mixer, portable, 11 cu ft	166.8	165.9	163.2	+ 2.2
Mixer, portable, 16 cu ft	172.7	172.2	166.5	+ 3.7
Mixer, truck, 6 cu yd	132.7	132.4	129.1	+ 2.8
Mixer, paving, 34 cu ft	193.5	193.5	188.6	+ 2.6
Concrete finisher & spreader	196.7	196.7	183.5	+ 7.2
Bituminous distributor	122.3	122.3	122.3	0
Bituminous spreader	170.2	170.2	160.3	+ 6.2
Bituminous paver	163.2	163.2*	155.8	+ 6.2
Off-Highway Trucks, Wagons (b)	**101.1**	**101.1**	**100.6**	**+ 0.5**
Contractors off-highway truck (b)	101.1	101.1	100.6	+ 0.5
Trailer dump wagon (b)	101.4	101.4	101.4	0

• (a) January 1955=100 • (b) January, 1958=100 *Revised
BLS Primary Market Price Indexes, U. S. Department of Labor, 1947-49=100

Machinery Sales Hold at High Level

New orders for construction and mining equipment poured into manufacturer's sales offices at a faster clip as 1959 ended. The New Orders Index rose to 244 in December, up 7% over the November rate.

The increase lifted December to the record high for the month set in 1958. And it brought the 1959 monthly average to a record 293, based on 1949 sales volume as 100. This topped 1958 by 25% and was 16% higher than 1956 record. The index is computed by the McGraw-Hill Economics Department from a sample of the industry.

List prices in December averaged only 1.5% higher than a year earlier. Several types of equipment increased much more than this, but last year's average rise was the smallest since the sharp 1953-54 recession in contractors' new business. The slowdown in the price uptrend was perhaps most significant because it occurred in a year when new orders boomed. This probably reflects several factors:

- Steel prices held steady for the first year since price-controlled 1951.
- Sharper competition among equipment makers for contractors' equipment dollars.
- Output in physical terms is well below capacity to produce, despite rising orders.
- Prices had increased 28% during 1955-58.

The construction equipment industry produced at only 60% of its capacity in 1959, compared with 68% in 1958 and 85% in the record year 1956. Output of the more than 600 firms in the industry was $1.8 billion last year, according to the Construction Machinery Division, Business & Defense Services Administration of the Department of Commerce. This compares with $2.4 billion in the big year 1956. The Commerce Department also reported that inventories of new and used equipment are relatively high now.

U. S. ROYAL V-BELTS from the Power Unlimited complete belt line

Exclusive new process gives

balanced driving power

Now you can give your equipment the kind of driving power that comes only from V-belts that are as close-to-perfect as the world's most advanced manufacturing methods can make them. Specially developed equipment automatically controls thickness, weight, density, length, and tension members so precisely that each U. S. Royal gives you *balanced* driving power that pays off in every aspect of a belt's performance.

Smoother running. Variations inherent in other belts lead to vibration, intermittent slippage, increased bearing wear, excessive heat build-up, and early belt failure. Because of the "balanced driving power" resulting from exclusive manufacturing processes, U. S. Royals are the sweetest running belts in the business.

Unequaled length stability. Test after test has demonstrated that each U. S. Royal V-Belt with balanced driving power is a perfect working match for the others in its set. And every U. S. Royal V-Belt on a multiple drive will *continue* to pull its share of the load long after other "matched" belts have begun to assert their individuality.

No weak spots. Because there are no "weak links," you get longer lasting driving power and greater freedom from maintenance than ever before. Take advantage of the balanced driving power only U. S. Royal V-Belts offer. Your "U. S." Power Transmission Distributor has full stocks to service you promptly.

Mechanical Goods Division

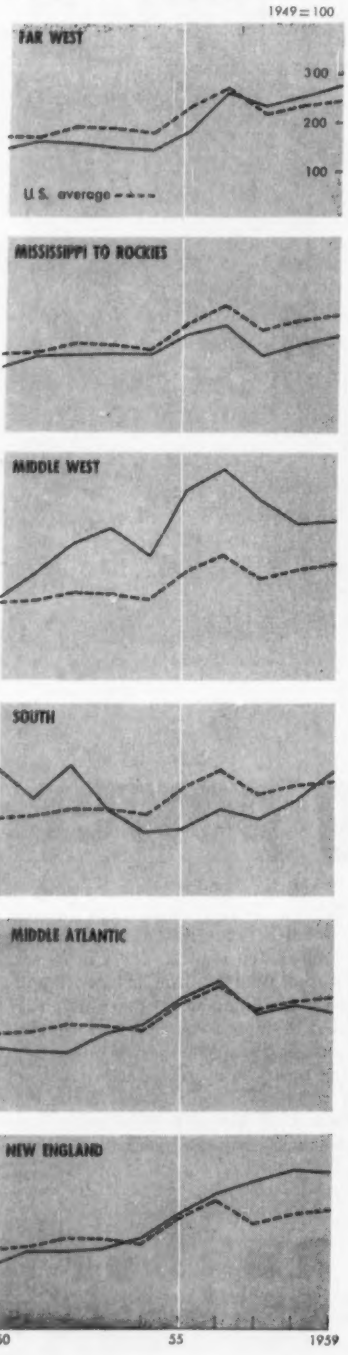
United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

Midwest Leads in Growth

HOW REGIONAL CONSTRUCTION MARKETS GREW IN THE FIFTIES



THE STATES of the Middle West set the pace for the fast-growing heavy construction market durin gthe last 10 years. This region's awards in 1959 totaled more than three and one-third times as much as in 1949; during the 1956 boom it racked up a total nearly four and one-half times as large as 1949, *Construction Methods'* figures show.

Though the New England area is a much smaller heavy construction market, it is giving the Midwest a close race for growth leadership. Moreover, New England's growth has been more consistent, increasing every year since 1949 except 1952 and 1959.

The two biggest regions in terms of total contracts let last year actually grew at a slower rate than other sections during the decade. The Middle Atlantic, biggest market in 1959, and the Mississippi to the Rockies, second largest, could boast only a little over twice as much work in 1959 as in 1949. Though the Middle Atlantic states forged ahead of national growth rate in 1954-1956 period, they dropped back in the 1957-1959 period. The Mississippi to the Rockies area consistently lagged behind the rest of the country.

The Far West and South were fast comers as the decade ended. Each was rapidly closing in on the leaders and had not far to go before annual volume would be triple the 1949 totals.

Heavy construction in the Far West showed little change during 1950-1954. But business perked up in 1955 and last year the region scored its biggest volume in history. Private construction takes all the credit for the 1959 increase. Private awards jumped 31% ahead of 1958. Housing, commercial building, and pipeline construction sparked the upsurge in private work.

A 28% cut in highway awards held public works last year at the 1958 level in the Far West. But waterworks jumped 35%, sewerage climbed 23%, and earthworks - dams - waterworks zoomed 82%.

Contracts rocketed upward in the South during 1958 and 1959. But this wasn't quite enough to beat the record highs set in 1950 and 1952 when huge atomic power plants sent the contract totals soaring. However, it was enough to pull the South's trend of awards above the U. S. average for the first time since 1952.

Spurring the South upward last year were booming awards for private work — industrial building up 171% over 1958, commercial up 76%, and mass housing up 88%. These huge gains in each type of work far exceeded the 1959 increases in any of the other five regions. In addition, there were unusually big increases in waterworks, up 35%, sewerage, up 71%, and public nonresidential building, up 43%.

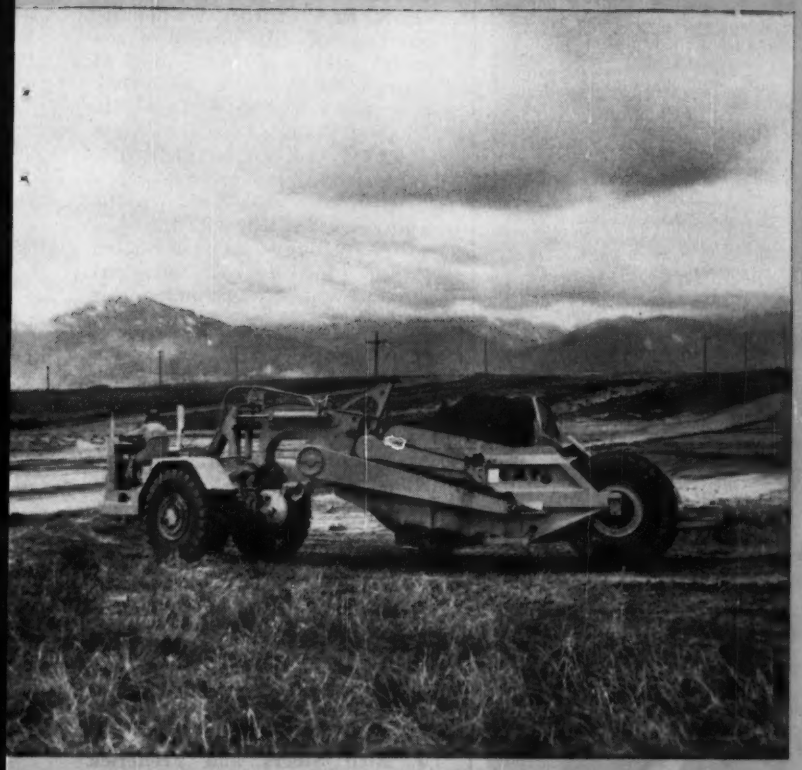
Heavy Construction Contract Trends by Regions 1949-59

VALUE OF CONTRACTS IN MILLIONS OF DOLLARS, REPORTED BY CM&E

Region	1949	1955	1956	1957	1958	1959	Change '58-'59 %	Change '49-'59 %
New England	391	927	1,108	1,191	1,289	1,270	- 1	+225
Mid-Atlantic	2,068	5,000	5,596	4,340	4,777	4,382	- 8	+112
South	1,365	2,013	2,556	2,259	2,733	3,593	+31	+163
Midwest	1,046	4,188	4,625	3,933	3,458	3,507	+ 1	+235
Miss. to Rockies	2,098	4,395	4,732	3,471	3,922	4,245	+ 8	+102
Far West	1,189	2,200	3,094	2,792	2,987	3,283	+10	+176
U. S. Total	8,157	18,722	21,712	17,986	19,165	20,279	+ 6	+149

Percent of U. S. Total	1949	1955	1956	1957	1958	1959	Average '50-'54	Average '55-'59
New England	4.8	4.9	5.1	6.6	6.7	6.3	4.3	5.9
Mid-Atlantic	25.4	26.6	25.8	24.1	24.9	21.6	21.2	24.6
South	16.7	10.8	11.8	12.6	14.3	17.7	20.3	13.5
Midwest	12.8	22.3	21.3	21.9	18.0	17.3	18.7	20.1
Miss. to Rockies	25.7	23.4	21.8	19.3	20.5	20.9	23.0	21.2
Far West	14.6	11.7	14.2	15.5	15.6	16.2	12.5	14.7

JOB REPORT ON TWO CAT NO. 619 TRACTORS WITH MATCHING NO. 442 LOWBOWL SCRAPERS...



Good maneuverability, power and acceleration!

Hauling, as well as dumping close and maneuvering in tight quarters, the No. 619-No. 442 is proving its worth on the Park Hill Subdivision, Colorado Springs, Colorado. Typical performance pushloaded by a D8: On a 3700-foot round-trip haul, the No. 619-No. 442 averages 3.38-minute cycles and handles 15 to 16 bank yards per load for production of 220 bank yards an hour.

Alexander Construction Company is using two Caterpillar No. 619-No. 442 rigs for dirt work on the Park Hill Subdivision, Colorado Springs, Colorado. The project, which covers 340 undeveloped acres, will one day have 1282 homes. About 2,000,000 cubic yards of damp sandy loam are involved in the section where the machines are now shaping land, and the job calls for a great deal of close dumping and maneuvering in tight quarters. Operator Clarence B. Kusma sums up the No. 619s' performance this way: "They handle good. Turn short. Have well-located controls. Get up to 5th gear in about 1000 feet on the flat."

On this project, as on other projects, the No. 619-No. 442 is living up to its advance notices as an excellent "all job" rig. Here are some reasons why. Its Turbocharged Cat Engine provides 225 HP and high torque rise, ideal for lugging under load and for fast acceleration. Its LOWBOWL Scraper handles 14 cu. yd. struck, 18 cu. yd. heaped. It has 30 MPH usable operating speed, plus ground-hugging roadability never before found in a two-wheel tractor of comparable size. New 2-jack hydraulic steering makes it extremely easy to maneuver, yet retains that important "feel of the road" touch. And advance design permits full 90° turns and a turning diameter of 30 feet.

Get the full facts about the "all job" No. 619-No. 442 from your Caterpillar Dealer. Compare it with any two-wheel tractor of similar size for money-making performance. Ask for a demonstration—see for yourself how you can make use of its versatility to step up production on your job!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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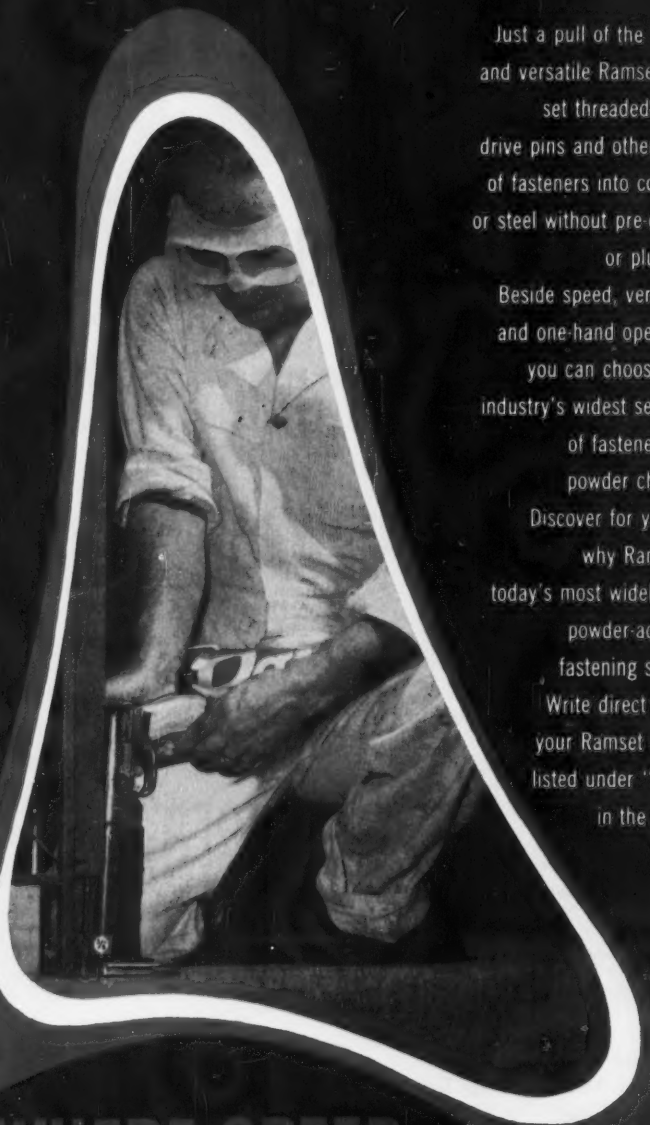
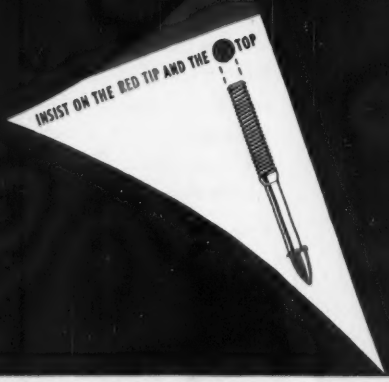
NO. 619-NO. 442 FOR "ALL JOB" VERSATILITY

leading contractors use **Ramset**



Just a pull of the trigger and versatile Ramset tools set threaded studs, drive pins and other types of fasteners into concrete or steel without pre-drilling or plugging. Beside speed, versatility and one-hand operation, you can choose from industry's widest selection of fasteners and powder charges. Discover for yourself why Ramset is today's most widely used powder-actuated fastening system. Write direct or call your Ramset dealer, listed under "Tools" in the Yellow Pages.

WHERE SPEED IS VITAL



Ramset® Fastening System

OLIN MATHIESON CHEMICAL CORP. · WINCHESTER-WESTERN DIV. · 281-B WINCHESTER AVE. · NEW HAVEN 4, CONN.

SOME BIG CONTRACT AWARDS OF THE MONTH

Inland Construction Co., Morton Grove, Ill. Construct two department stores with paving of adjacent area and installation of sewers and mains at Oakbrook Shopping Center in Hinsdale, Ill. Marshall Field & Co., 111 N. State St., Chicago 2, Ill. $35,000,000.

Peter Kiewit Sons' Co., Arcadia, Calif. Construct three Titan missile launching sites and related technical facilities in Placer, Pennington, and Butte Counties near Beale Air Force Base, Calif. Corps of Engineers, 1209 8th St., Sacramento, Calif. $30,157,150.

H. R. H. Construction Corp., New York, N. Y. Erect a 25-story housing project on the site of Ebbets Field in Brooklyn, N. Y. Marvin Kratter, 521 Fifth Ave., New York 17, N. Y. $22,682,000.

Pacific Pipeline Construction Co., Montebello, Calif. Construct 116-mi natural gas pipeline from Barstow to Needles, Calif. Pacific Lighting Gas Supply Co., 810 S. Flower St., Los Angeles 17, Calif. $17,300,000.

J. Rich Steers and **Frederick Snare Corp.,** both of New York, N. Y. Erect tower piers for the Narrows Bridge at the entrance to New York harbor. Triborough Bridge & Tunnel Authority, Administration Bldg., Randalls Island, New York 35, N. Y. $16,527,975.

Aberthaw Construction Co., Boston, Mass. Construct an industrial research center containing 1,000,000 sq ft of floor area. Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, Mass. $15,000,000.

Hass & Haynie, San Francisco, Calif. Erect a hotel with related resort facilities at Honolulu, Hawaii. Sheraton Hotels, Inc., 2259 Kalakau St., Honolulu, Hawaii. $14,000,000.

Perini Corp., Framingham, Mass. Construct lock for the Walter F. George Lock and Dam on the Chattahoochee River near Fort Gaines, Ga. Corps of Engineers, 2301 Grant St., Mobile, Ala. $11,767,700.

continued on page 53

ENGINEER'S FIELD REPORT

PRODUCT: RPM MULTI-SERVICE GEAR LUBRICANT

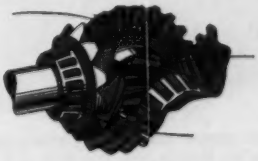
FIRM: YAKIMA CEMENT PRODUCTS CO. Yakima, Washington

No scoring or pitting of differential gears in 6 years

In Six Years of using RPM Multi-Service Gear Lubricant, not one differential in the entire 20-truck fleet of Yakima Cement Products Co. has shown any scoring or pitting of gear teeth. Despite grueling service delivering ready-mix concrete and other building materials to off-highway construction sites, lubricant has never failed to do its job. Firm's six-wheel-drive trucks supply sand, gravel, ready-mix concrete, and fabricated concrete products to projects within 100 miles of Yakima, Washington.

Ready-Mix Truck like rest of firm's vehicles, is rebuilt Army surplus 2½-3 ton International. "In the fleet of 21 six-wheel-drive trucks, we have never had a transmission or differential failure due to lubrication, despite our severe operating conditions since we started using RPM Multi-Service Gear Lubricant," says firm's chief mechanic, Art Weber. This lubricant is also used in all mixer drive gear boxes.

Why RPM Multi-Service Gear Lubricant prevents wear



- Special compound forms protective lubricating coating on gears by chemical reaction with metal...resists rubbing action of hypoid gear teeth.
- Withstands extreme temperatures and pressures...highly oxidation resistant...keeps bearings and gears cool.
- Inhibitors resist rusting, stop foaming...lubricates integral bearings...will not separate.

For More Information or field help with any fuel or lubrication problem, contact representative of any company listed or write direct.

AUTOMOTIVE LUBRICANTS RPM

TRADEMARK "RPM DELO" AND DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

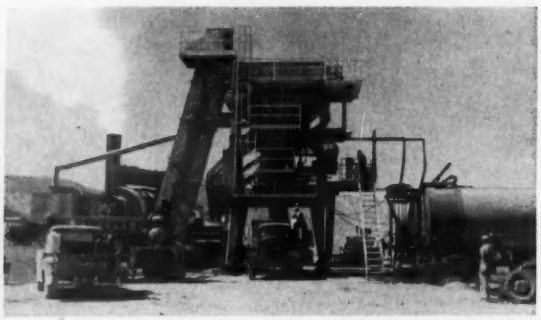
MADSEN Money-Makers for the '60s

1960 commemorates MADSEN's 50th year of designing and manufacturing asphalt plants and asphalt plant equipment.

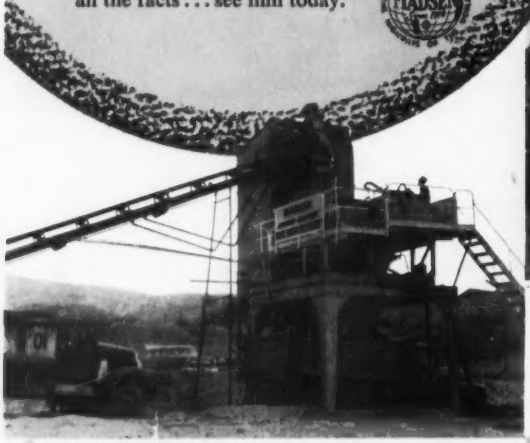
The record tonnage production and money-making ability of today's MADSEN plants is the result of the experience and know-how gained during these 50 years of service to the asphalt paving industry.

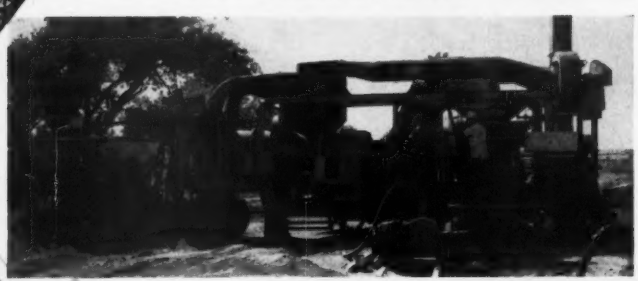
MADSEN's years-ahead engineering gives you much more than high daily production. MADSEN Asphalt Plants have always been noted for their low operating costs and easy, low-cost servicing and maintenance. Add to this complete portability, cleanest operation and improved mixing action . . . and you can see why the purchase of a MADSEN Plant is your logical "first step" for more profits in the '60s.

Your MADSEN Distributor has all the facts . . . see him today.



MADSEN MODEL 481 ASPHALT PLANT... the industry's outstanding batch capacity asphalt plant, built in 4000 lb., 5000 lb. and 6000 lb. capacities. Factory-matched unit sections assure quick field erection. Plant features faster mixing, exclusive bin design for more uniform aggregate withdrawal, roll-away weigh-box for quick, easy servicing and maintenance, and finger-tip control of weighing and mixing operations. (Fully automatic operation is optional.) Capacities up to 300 T.P.H.

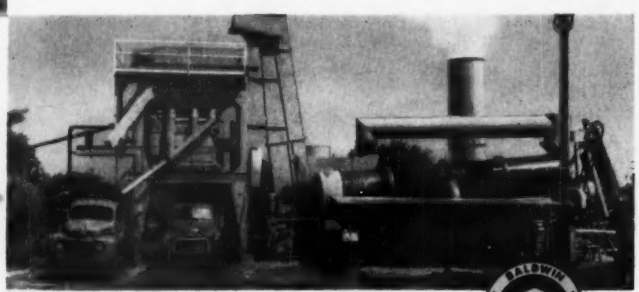




THE LITTLE MONSTER®.. this complete asphalt mixing plant on wheels is designed for fast-moving, fast set-up and substantial daily production. Plant shown is owned by a State Highway Department. It is complete including two MADSEN 32" x 10' Dryers, a MADSEN 2-compartment portable feed bunker and dual cold stone elevators. Mixer unloading skip loads asphalt into trucks. Plant is rated at 30 T.P.H. on a one-minute mixing cycle.

MADSEN HIGHWAY-AIRPORT BASE STABILIZER PLANT... newest addition to the MADSEN line. This plant is a high-production, portable plant designed specifically to meet today's exacting requirements in regard to precision proportioning and control of materials. The twin-shaft continuous-type pug mill mixer is designed for producing 600 T.P.H. of stabilized mix. Plant features rugged construction, mechanical simplicity and easy maintenance.

MADSEN 2000-LB. SPECIAL ASPHALT PLANT... a small plant with big plant features. The 2000-lb. SPECIAL is ideal for the not-too-large contractor, the municipality and the large contractor who wants a small type of operation for producing approximately 480 tons per 8-hour day (on a one-minute mixing cycle). It's an ideal plant for handling those jobs up to the 10,000-ton class.



MADSEN *Equipment that Serves*

FOR YOUR CONVENIENCE
MADSEN maintains a complete parts stock in Los Angeles and Lima, Ohio

50

MADSEN WORKS

P.O. BOX 38, La Mirada, California
BALDWIN-LIMA-HAMILTON CORPORATION, P.O. Box L, Lima, Ohio

Construction Equipment Division
BALDWIN-LIMA-HAMILTON CORPORATION

ASPHALT PLANTS • PUG MILL MIXERS • AGGREGATE DRYERS • DUST COLLECTORS • ROAD PUG TRAVEL MIX PLANTS • WEIGH BATCHERS • DUST WASHERS • FEED BUNKERS FEED TUNNELS • ASPHALT TANKS • ASPHALT & FUEL PUMP UNITS • CONCRETE FLOAT FINISHERS FOR AIRPORTS AND HIGHWAYS • HIGHWAY-AIRPORT BASE STABILIZER PLANTS

CONTRACTS AWARDED . . .

continued from page 50

Crump, Inc., Pittsburgh, Pa., **Psaty & Fuhrman, Inc.,** and **C. E. Youngdahl & Co., Inc.,** both of New York, N. Y. A joint venture to erect the North View Heights Housing Project in Pittsburgh, Pa. Pittsburgh Housing Authority, 200 Ross St., Pittsburgh, Pa. $10,719,000.

Western Contracting Co., Sioux City, Ia. Construct utility systems, taxiways and jet parking apron at Dulles International Airport, Chantilly, Va. Federal Aviation Agency, 16th and Constitution Aves., N.W., Washington 25, D.C. $10,486,000.

Nichols-Southern Division of Yuba Consolidated Industries, Inc., Baton Rouge, La. Construct concrete pavement and associated grade separation structures for 1.19-mi of Shreveport Expressway in Caddo Parish, La. State Dept. of Highways, Administration Bldg., Baton Rouge, La. $7,137,201.

Quaker Valley Constructors, Pittsburg, Kan. Erect a manufacturing plant in Orange, Tex. Spencer Chemical Co., Orange, Tex. $6,000,000.

Fredericksen & Kasler, Sacramento, Calif. Grading and paving for 7.7-mi of U. S. 91 near Corona, Calif. State Division of Highways, 120 S. Spring St., Sacramento, Calif. $5,755,891.

S. N. Nielsen Co., Chicago, Ill. Erect a housing project at 13th and Blue Island Ave., Chicago, Ill. Chicago Housing Authority, 608 S. Dearborn St., Chicago, Ill. $5,184,000.

R. E. Alderson, Colorado Springs, Colo. Construct a 12-story addition to the Broadmoore Hotel in Colorado Springs. Broadmoore Hotel, Colorado Springs, Colo. $5,000,000.

Morrison-Knudsen Co., Inc., Boise, Ida. and **Rumsey & Co.,** Seattle, Wash. A joint venture to erect bridges on the Seattle Freeway from Galer St. to Lakeview Blvd. in King County, Wash. State Highway Commission, Olympia, Wash. $3,982,242.

Austin-Western hydraulic crane gently lowers a 3-ton block of concrete into place on flat bed truck.

Austin-Western hydraulic crane does anything . . . goes anywhere on $6,500,000 highway project

"It's fast, mobile and versatile. We use the Austin-Western hydraulic crane to do just about everything on the job," reports Norman J. Maggione, general superintendent and vice president of the Bero Construction Co., Waterloo, N.Y.

Two places at once

Bero's $6,500,000 project, a part of the Niagara section of the New York Thruway calls for six bridges in 1¼ miles. Mr. Maggione says, "We have one A-W crane on the job and wish we had more. Our job is split in sections by railroad yards and city streets. Because of their speed and mobility, the self-propelled, rubber-mounted A-Ws can just about be in two places at once.

"Using the A-W crane has doubled our speed in setting bridge panels. It maneuvers easily among tubular pilings and can turn on a dime. It has plenty of traction and power on any type surface.

Economical to operate, maintain

"We've got lots of economy right along with outstanding job performance. One man on an A-W can often do the work of four. We haven't had any maintenance problems.

"The A-Ws are radio-dispatched. People are always calling for one to get them out of a spot or to speed things up. It's the most versatile piece of equipment on the job!"

Learn more about this Model 210 hydraulic controlled precision crane with 18-ft. telescoping boom and 360° swing, all-wheel drive and steering. Contact your nearby Austin-Western distributor or write us today.

Austin 1859 AUSTIN-WESTERN 1959 100th YEAR PARTNERS IN PROGRESS Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

Completely portable Lima A-W crushing installation has primary 20 by 36-in. jaw crusher, Model 101-CE secondary plant and 7-yd. surge bin. Delivers exceptionally high production for Maymead Lime Co. in Tennessee.

How Lima Austin-Westerns BEAT RISING COSTS!

Higher output, lower maintenance. These two cost reducers are characteristic of Lima Austin-Western Crushing, Screening and Washing equipment.

Advanced engineering design assures top operating efficiency for years—free of maintenance problems and costly downtime. Improved manufacturing processes and extensive use of anti-friction bearings and heat-treated alloy steels also add to the dependability of this rugged, precision-built machinery.

Lima A-W offers a complete crushing, screening and washing line including jaw and roll crushers, matching screens, conveyors and bins. Stop increasing costs; learn how Lima Austin-Western meets your exact needs for low-cost, accurately sized specification materials. See your nearby distributor or write to Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio.

Lima Austin-Westerns available for stationary or portable installation.

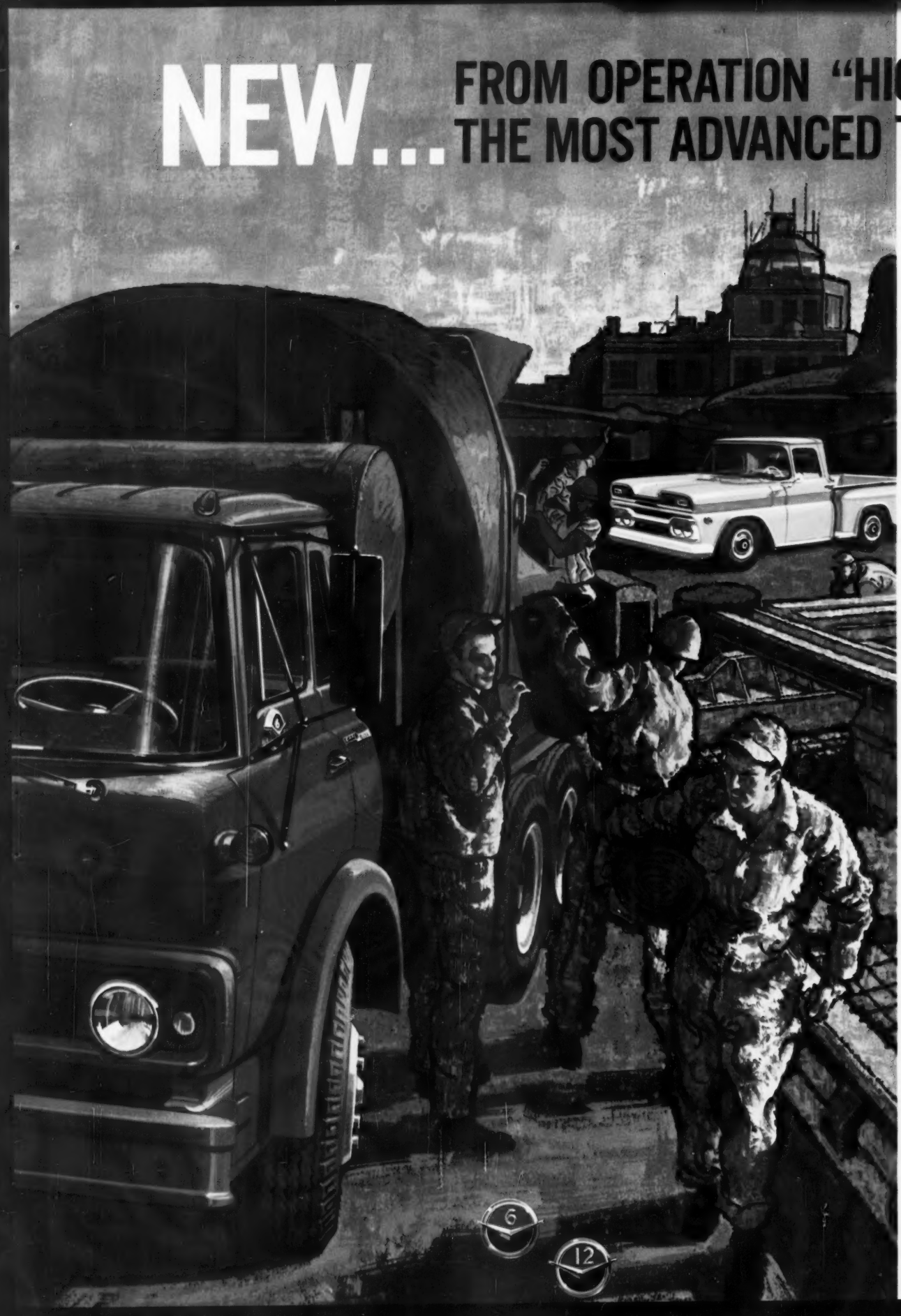
DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

607


NEW... FROM OPERATION "HIGH
THE MOST ADVANCED TR

GH GEAR"
TRUCKS IN 20 YEARS!

Only GMC can offer contractors *all* these money-saving, money-making features in 90-inch BBC trucks: V-6 gas, Twin-Six gas and V-6 diesel power. Specially-reinforced double-life cabs. GCW to 120,000 lbs. 3-piece side-opening hood and swing-out grille sections for easiest, quickest servicing. There's a lot more. See the new Conventional Ninety-Inchers today.

This GMC 4000 Series is typical of the new '60 Conventionals. With a choice of 150, 165 and 180 hp. V-6 engines; 15 axle-transmission combinations; vacuum or full air brakes; you have all the flexibility needed to exactly meet all construction hauling requirements in the 19,500-23,000-lb. GVW range . . . the one truck that will keep job time down and profits up.

New GMC Pickups outlast all others! Rugged new V-6 gives up to 3 times longer engine life . . . saves up to 10% on gas. New rigid frames resist twisting and increase cab life. New independent front suspension and coil rear springs give a smoother ride, easier handling. Choice of 34 combinations including 4-wheel-drive models.

Under this new GMC tilt-cab is the exclusive 205 hp. V-6! One demonstration will prove the superior performance, extremely short turning and biggest safety vision. Shown is the LW 5500 Series with up to 48,000 lbs. GVW, up to 60,000 lbs. GCW. New steel tilt-cabs have a 72-inch BBC and 52-inch front axle placement to haul biggest loads. They stay on the job, are easy to service and drive.

GMC TRUCK & COACH—A GENERAL MOTORS DIVISION
PONTIAC, MICHIGAN

BIG GMC BREAK-THROUGH

in engine, chassis and cab engineering drastically cuts your hauling costs!

1. New engines that last up to 3 times longer than others!
2. New stronger, lighter frames to haul bigger loads longer!
3. New front and rear suspension! New wide track for easier maneuvering! Smoother ride and longer sheet metal life!
4. New roomier, more rugged cabs . . . complete range of BBC dimensions!
5. New "Power-Mated" drive lines with the proper gearing and strength to match every construction haul!

From ½-ton to 60-ton General Motors leads the way!

GMC
GENERAL MOTORS CORPORATION
TRUCKS

PULL

TODAY'S ONLY MODERN TRUCK CHASSIS!

NEW Springs with Longer Life and Easier Ride—GMC's standard 3-inch wide vari-rate rear springs last longer on any terrain, because they are under less stress. All braking and torque forces, normally absorbed by springs, are directed to the frame by the strong radius-rod-type leaf. New true progressive cam action adjusts the spring to the load . . . an easier ride—empty or loaded.

NEW Frames with Extra Strength and Rigidity—One look shows GMC frames are extremely rugged . . . built for the most severe construction hauls. Unique design, stronger materials and exclusive construction methods guarantee extra load-carrying ability, extra durability.

NEW Double-Life Cabs—1960 GMC cabs will stand up for many years even on the most rugged construction hauls . . . last twice as long as ordinary cabs. This great durability is the result of full double-wall construction, extra-heavy reinforcing inside the cab and special, sturdy understructure—as shown above.

FROM GMC...

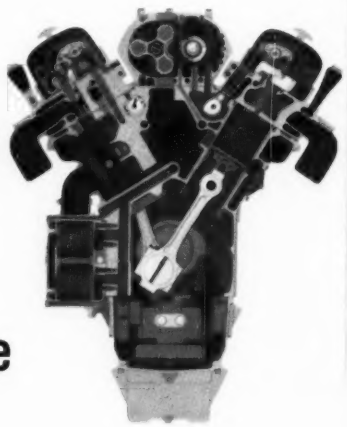
NEW GMC TWIN-SIX Most pulling power of any standard gas engine!

Now you can get 630 pounds-feet torque over an extended engine speed range! Plenty of working power and reserve power in this 702 cubic-inch power plant to get the biggest construction loads moving—and keep them rolling—with least shifting.

It's lasting power, too. Maximum governed engine speed is only 2400 rpm. This low-stress, easy-stroking speed greatly extends engine life, cuts operating costs to the bone.

Max. torque 630 @ 16-1900. Max. hp. 275 @ 2400.

NEW V-6 DIESEL Most power per dollar! lowest maintenance costs!



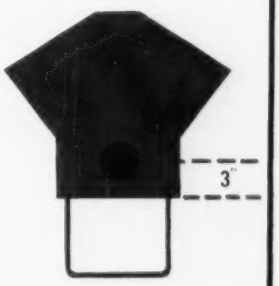
Proved, efficient 2-cycle design with power on every stroke gives you more power per dollar, more power per pound, more power per cu. in. displacement! Extra-sturdy construction and modern, simplified design keeps GMC Truck diesel engine maintenance costs far below competitive engines. Also important to cut down-time—you get complete one-stop parts and service at every GMC Diesel Truck Dealer.

189 hp. standard. 210 hp. optional at no extra cost.

NOTE: With this new, advanced 6V-71 engine, you get all the time-tested performance, economy and durability features of the famous GMC 6-71SE diesel in a shorter, lighter and more compact design.

TODAY'S ONLY TRULY MODERN ENGINE DESIGN

V·6



Full, Rigid Crankshaft Support!

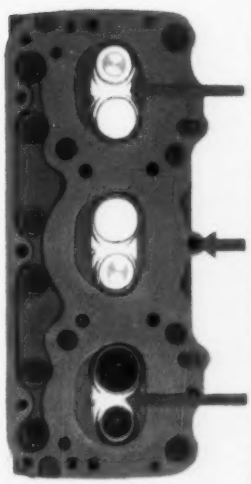
Short, rigid V-6 block has extended cast skirt that reaches 3 full inches below the center line of the crankshaft to minimize distortion and deflection, costly wear and failures.

NEW GMC V-6 ENGINES

Outlast all others! Up to 3 times longer life—proved by actual tests!

Here's why—full torque is produced at low, economical engine speeds! Full power extends over a broad rpm range! "Over-square" design, shortest stroke of any comparable truck-built engines, cuts wear and improves performance! 33% more cooling area, 3 times more water volume (up to 176 gallons per minute) eliminates all life-killing engine "hot spots"! High-volume lubrication (up to 14 gallons per minute) increases longevity!

THERE'S A NEW V-6 FOR PROFIT-PERFORMANCE ON EVERY HAUL		
Model	Max. Torque	Max. Horsepower
305A	260 @ 16-2000	150 @ 3600
305B	266 @ 12-1400	150 @ 3600
305C	270 @ 14-1600	165 @ 3800
351	312 @ 18-2000	180 @ 3400
401	377 @ 1400	205 @ 3200



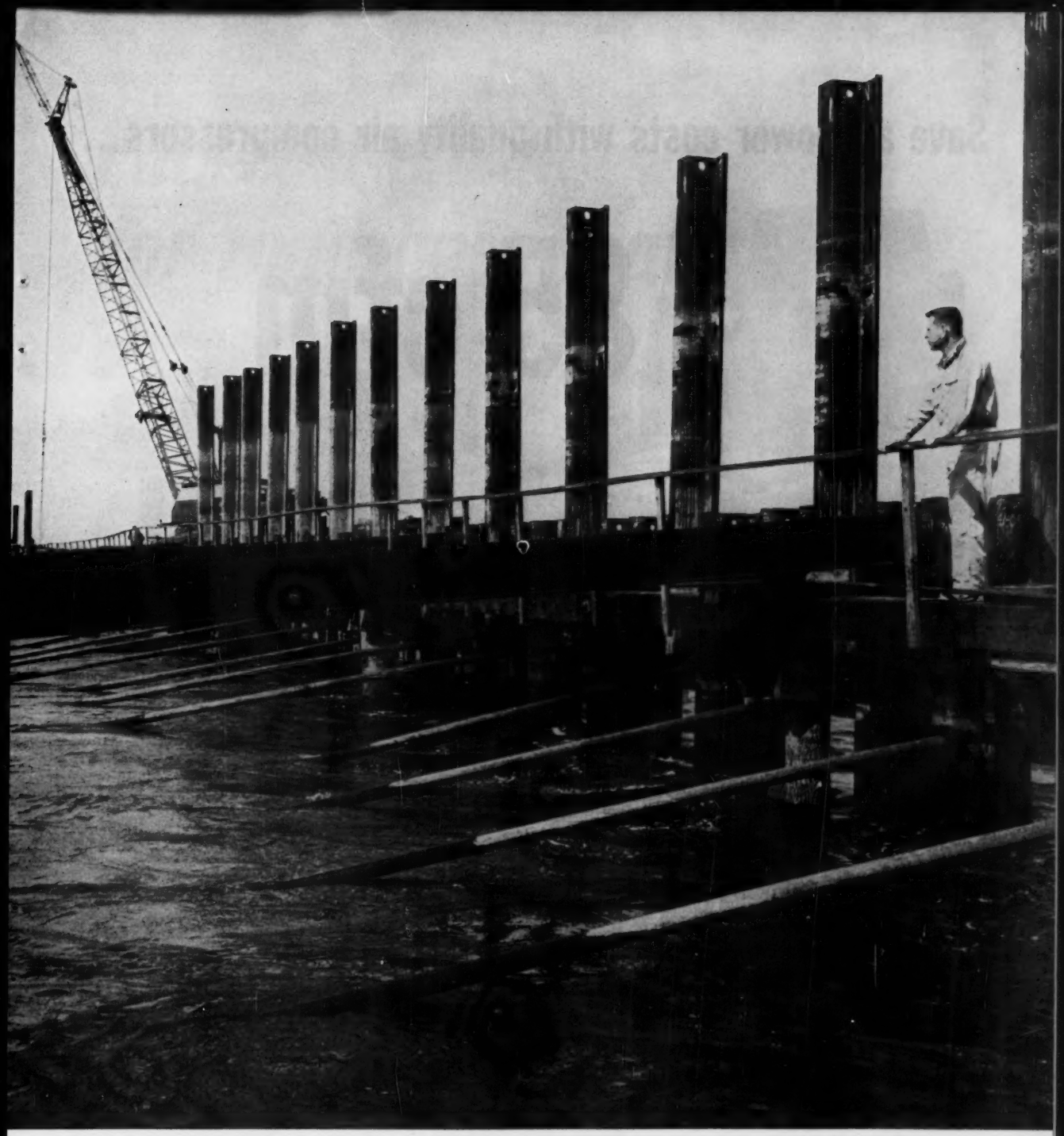
Fully machined combustion chambers assure equal displacement in each cylinder for smoothest power. There are no destructive "hot spots" due to carbon build-up.

6 bolts around each cylinder (not 4) make a positive head-to-block seal and eliminate bore deflection.

Note: No two exhaust valves are adjacent. Heat concentration is prevented to extend valve life.

This widest bridge permits the best cooling, 3 times more water for faster heat transfer, greatly increased valve life.

See your GMC Truck Dealer listed in the Yellow Pages for the most advanced construction trucks in 20 years!



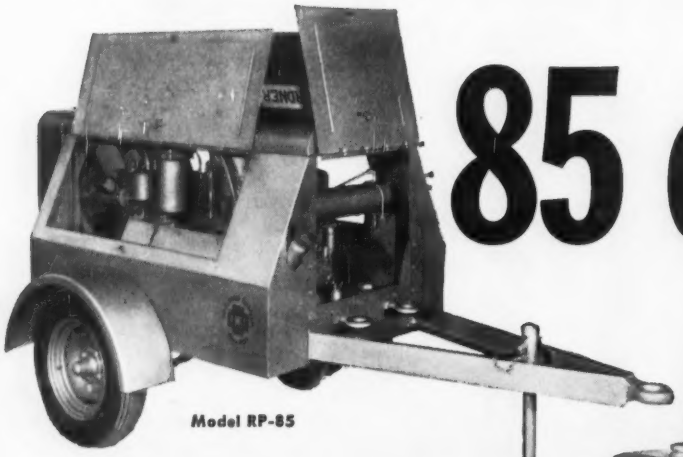
These Bethlehem multiple-unit tie rods are 105 ft long. But Bethlehem supplies multiple-unit tie rods in much greater lengths. Any lengths, to be exact. Cut-thread tie rods, plain or upset, in diameters through 4½ in. Rolled-thread tie rods in diameters through 1½ in. Single-unit tie rods up to 65 ft long. Both multiple- and single-units can be ordered straight or bent, asphaltum-dipped, or hot-dip galvanized. Delivery is fast. Just call or write the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Save air-power costs with quality air compressors...



Model RP-85

85 cfm

125 cfm

Model RP-125

GARDNER-DENVER ROTARY PORTABLES

SAVE GAS—"THRIFTMETER"® fuel control regulates engine speed to meet air demands . . . saves gas, and wear on engine and compressor.

SAVE MOVING TIME—compact design. Husky drawbar and stability make towing easy. Equalizer stands provided to save setup time.

SAVE ON MAINTENANCE—ruggedly built for dependable all-weather operation. Rotors and vanes of compressor accessible for easy inspection and maintenance.

AMPLE TOOL STORAGE—both sides of compressor have ample space for storing air tools and hose.

See your Gardner-Denver distributor for complete details

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

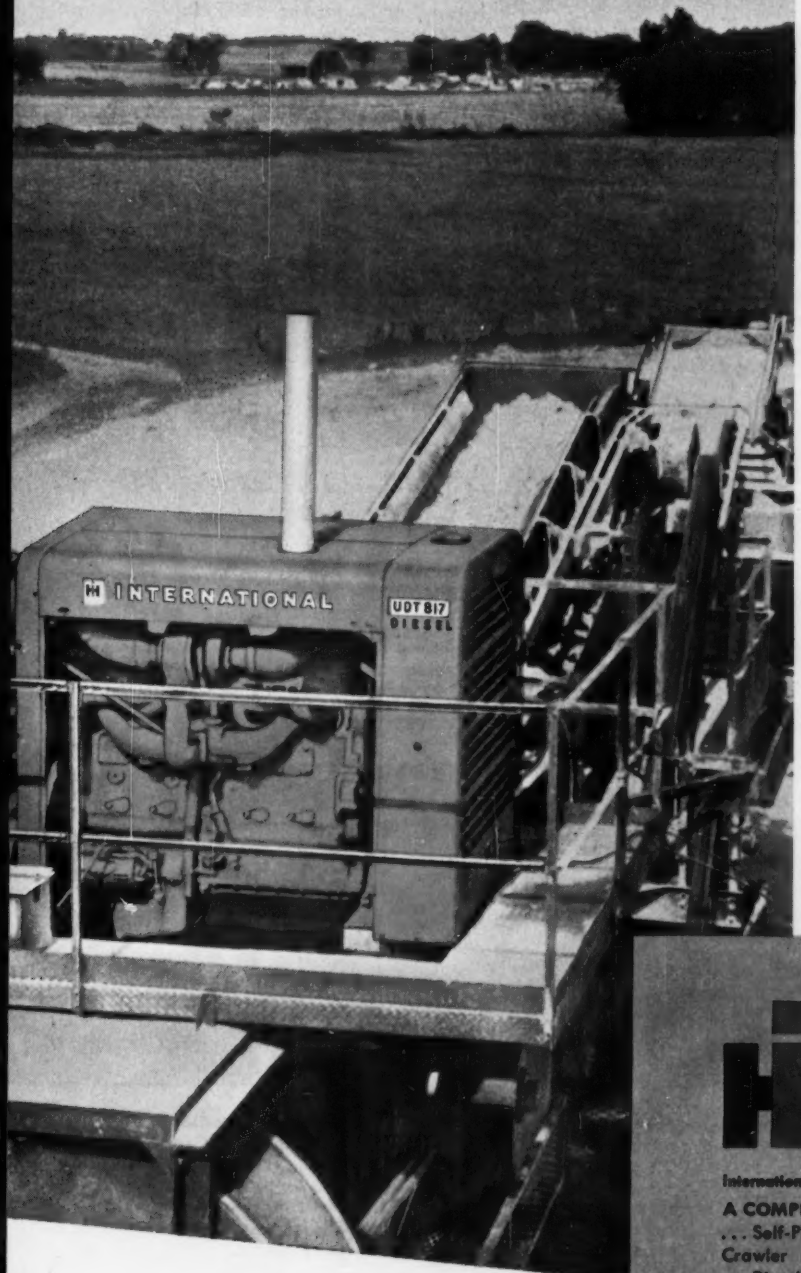
GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

IH power

cuts cost-per-ton for road base material

"Only way we could make a profit on this job was to increase crushing volume, so we bought a new International UDT-817"



Reports Co-owner Eugene Nelson, of Madison Stone Construction Co. "When we contracted to supply Wisconsin's new Highway 49 with 50,000 tons of crushed rock at $1.56 per ton, we knew our profits would depend on continuous high production. For this we turned to International power. We aimed at a production rate of 180 tons per hour, but have been able to load a 15-ton truck every four minutes, or well over 200 tons per hour! Specifications called for crushing the hard Niagara limestone to one inch. We needed more power, but wanted a smaller unit, and this turbocharged International fills the bill."

When rising costs put you in a bind, contact your IH Engine distributor or dealer, and back up your bid with low-cost, dependable International power. Choose from 24 well-spaced models from 16.8 to 385 maximum horsepower—the fastest payback power.

INTERNATIONAL®

IH ENGINES

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

ALL OVER THE U.S.A., CONTRACTORS

power-steer and power-shift

NO ATTACHMENT! NO AFTER-THOUGHT! NO "STOP-GAP"!

Exclusive, years'-proven combined Planet Power-steering and Hi-Lo power-shifting are designed-in, built-in, basic standard equipment of the new 230-hp International TD-25!

Simplified TD-25 design is the only planetary system engineered and located to give you the dual advantages of "live track" steering and on-the-go shifting!

"Live track" Planet Power-steering eliminates load-limiting "dead-track drag"—gives power to pull full loads on turns, as well as on straight-aways. On-the-go, Hi-Lo power-shifting does away with time-wasting "gear-shift lag"—lets you match power to load instantly for full-speed cycles!

No wonder the new TD-25 can outearn king-sized clutch-steered crawlers up to 50%—on push-loading; land-clearing; overburden removal; benching; "mass-production" dozing; ripping; other tough jobs!

New TD-25 seven-roller tracks are strength matched to the full effort of the new 230-hp diesel engine. The "25" is platformed on super-rugged double-box beam frames—and is smoothly carried on International's dual-protected Dura-Rollers, the track rollers that make 1,000-hr lube intervals practical!

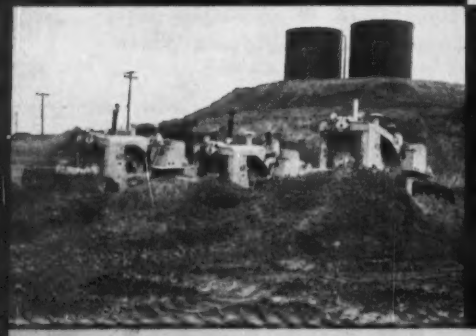
Power-shift and power-steer the "25" with king-sized loads—around curves, upgrade, anywhere. Compare the advantages of getting this exclusive performance, and getting it from years'-proven standard equipment. Prove what's behind the "25's" rapid rise to nationwide contractor acceptance. Let your International Construction Equipment Distributor demonstrate!

Though "out-rated" 105-hp by a king-sized, clutch-steered competitor, this nimble TD-25 proves able to outwork "the big one"—side-casting and benching to build Pacific Northwest mountain logging roads!

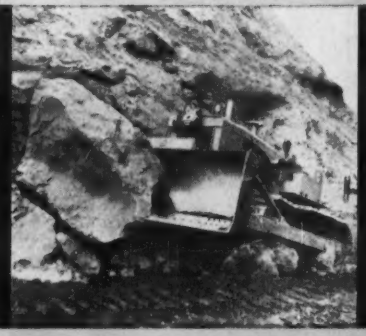
International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.



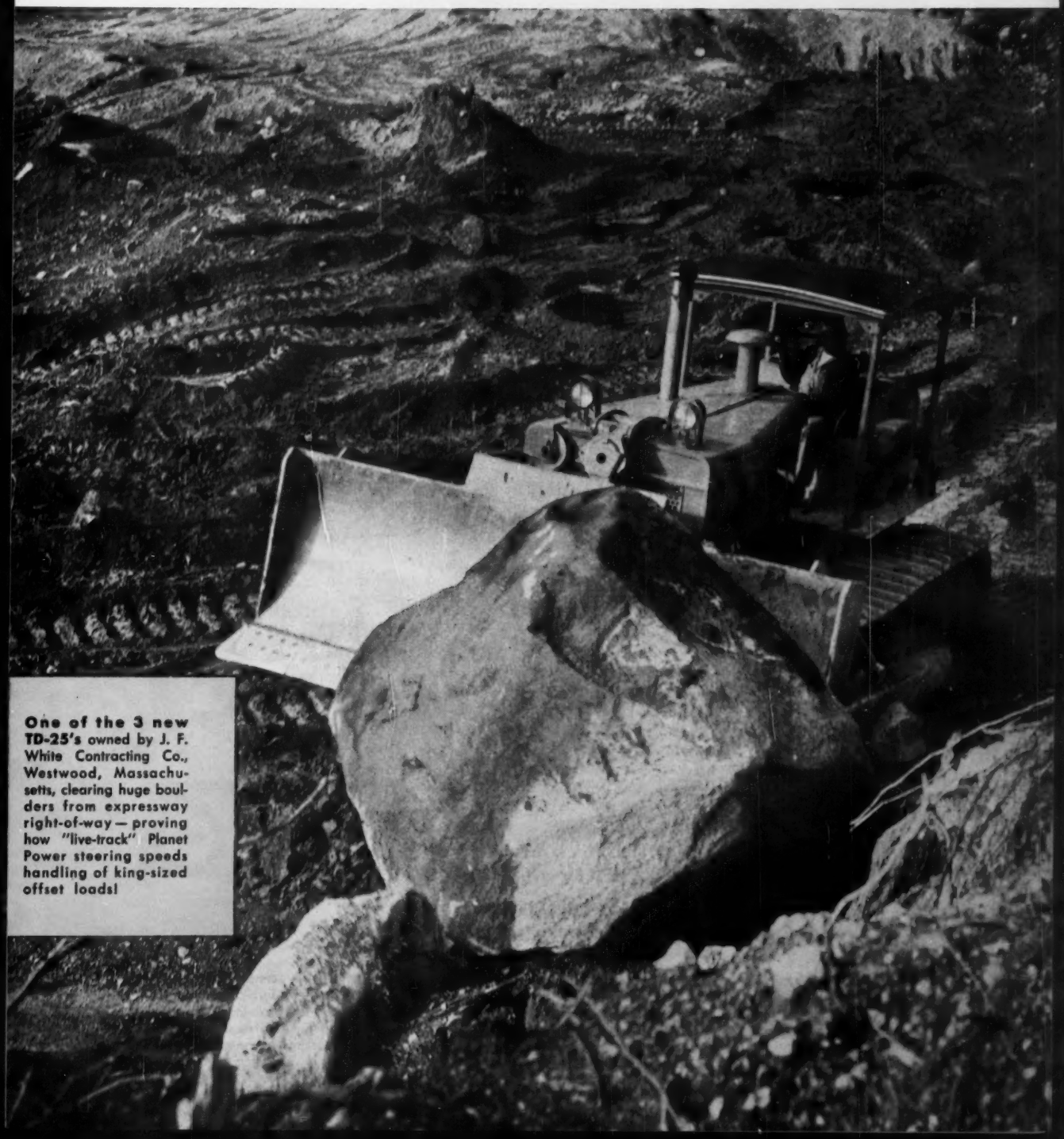
Three new International TD-25's of contractor V. E. Posey's fleet team up to prepare homesites from a mountainside—near San Diego, California. Dual-valving of the "25's" direct-start DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated performance, from sea level to timberline!



Cleaning the face of a Missouri strip mine behind a big dragline, this TD-25 pushes "tractor-sized" boulders aside with the greatest of ease. This "25" also builds dragline walkways and haul roads—and drastically cuts land-clearing costs for Peabody Coal Co.

For cycle-speeding push-loading, TD-25 power-shifting helps give "feather-touch" contact; maintains solid push-block contact on curves; gives gear-higher kick-outs than ordinary. The two "25's" tandem pushing the International 295 Payscraper®, and the third one ripping, belong to superhighway contractor Ed Bentley, Sylacauga, Alabama.

with TD-25 standard equipment!



One of the 3 new TD-25's owned by J. F. White Contracting Co., Westwood, Massachusetts, clearing huge boulders from expressway right-of-way — proving how "live-track" Planet Power steering speeds handling of king-sized offset loads!

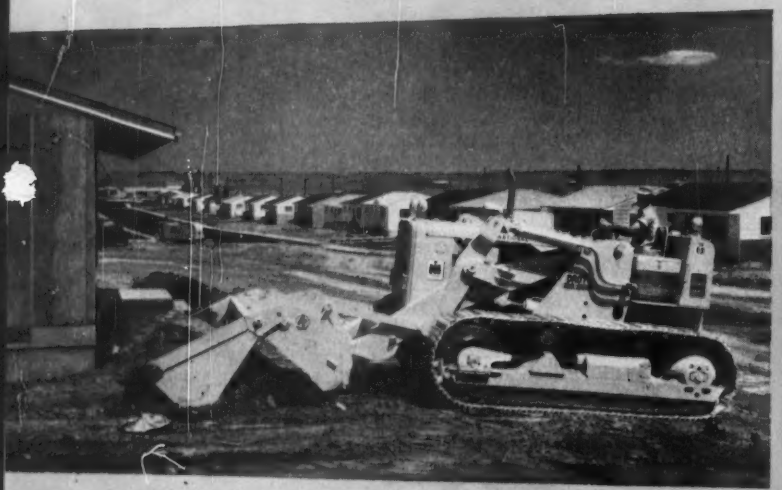
Behind Mr. Black his new 2¼ cu. yd. TD-15 Four-in-One is roughing out a new street with the earthrolling bulldozer action. He can compete with a dozer outfit —because the clam-action 4-in-1 can duplicate bulldozer performance, in capacity, range, and accuracy of control.

Power-shovel-like excavating force —applied with 4-in-1's super-powerful pry-over-shoe break-out action—enables the operator to heap 'er full, every pass, even in hard digging. The "15" can deliver 39,200 lbs. of break-out force!

"Other rigs only 'doze, or grade, or load

...my TD-15 Four-in-One does ALL...and more"

—T. P. BLACK, SR., CHEYENNE, WYOMING



To grade in cramped quarters—to load elusive loose materials without "chasing" them—the 4-in-1's operator simply uses a back-drag motion of the clamshell! Use this same action to do positive, self-clean-out bottom dumping —that eliminates the sticky materials problem.

Using carry-type scraper action, Mr. Black's 4-in-1 operator grades with inch-close accuracy. Note how the earth "boils in" to heap-load the 4-in-1 speedily. This action can also be used to strip sod or topsoil—and do controlled spreading, on-the-go!

"I tried other machines," reports T. P. Black, Sr., Cheyenne, Wyoming, "but they couldn't compare with the International Drott 4-in-1." Other rigs, he found, could either load, or do dozer work, or grade, only.

"The 4-in-1 can do all and much more," he adds. "We excavate, bulldoze, load trucks, do rough or final grading on roads, or landscaping. Our TD-15 and TD-9 Four-in-Ones are perfect for everything. I can't do without them in my business."

All four International Drott diesel-powered 4-in-1's give you the smoothness and wallop of high-torque 6-cylinder engines. The "15" Four-in-One is powered by the millions-of-hours-proved 115 hp, 6-cylinder International D-554 diesel. And the "15" gives you the cycle-speeding advantages of 6-speed full-reverse transmission—with "single-stick" shift and Shuttle-Bar forward-reverse control. Plus high efficiency, dry-type sintered metal clutch facings!

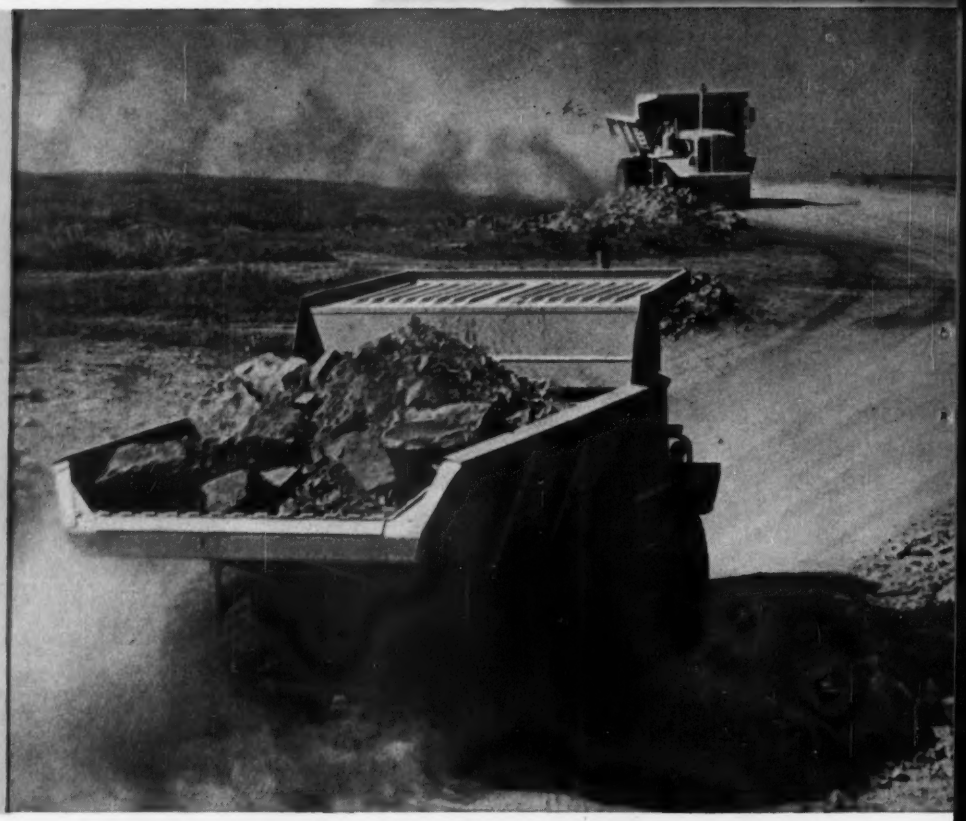
Why limit your income to what an old-style single-action loader, or any other limited-duty rig can earn you? See how each of the four, big-capacity 4-in-1 actions "doubles" for one or more special-duty machines—and each action gives you an amazing range of job-handling working positions. Compare exclusive shock-swallowing Hydro-Spring advantages, for positive, performance protection. Prove to yourself that only the clam-action 4-in-1 can upgrade you to multi-operation profits! Let your International Drott Distributor demonstrate.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT®

Walker Cut Stone Co., Milford, Kansas, replaced six smaller overworked gasoline haulers with only two 19-ton Model 65 Payhauler trucks! Their "65's" deliver 150 tons of limestone per hour, from quarry to crusher.

How new rock-ribbed 65 Payhauler® pair



speeds "write-off," replacing six smaller rigs!

—for Walker Cut Stone Co., Milford, Kansas

Two new International 19-ton 65 Payhauler trucks —with the new weight-saving corrugated bodies, and the new 250-hp D-817 diesel engine—have replaced six smaller gasoline trucks for Walker Cut Stone Co., Milford, Kansas.

Results are amazing! Only two operators instead of six to pay! Only 40 gallons of low-cost diesel fuel used daily (total) by the two Payhauler rigs—against several times 40 gallons of high-priced gasoline formerly swilled by the carbureted outfits! And only two machines to maintain, instead of six! "Write-off" of the Payhauler investment speeds in "high gear!"

Payhauler features increase capacity!

Even against competitive haulers of similar rated capacity, the new 65 Payhauler gives you overwhelming advantages!

Of all off-road haulers in its size class, only the 65 Payhauler has the International-developed rock-ribbed corrugated body! This strength-multiplying principle lets the "65" shed 5,000 lbs. of power-wasting weight, and gain a full ton of payload capacity.

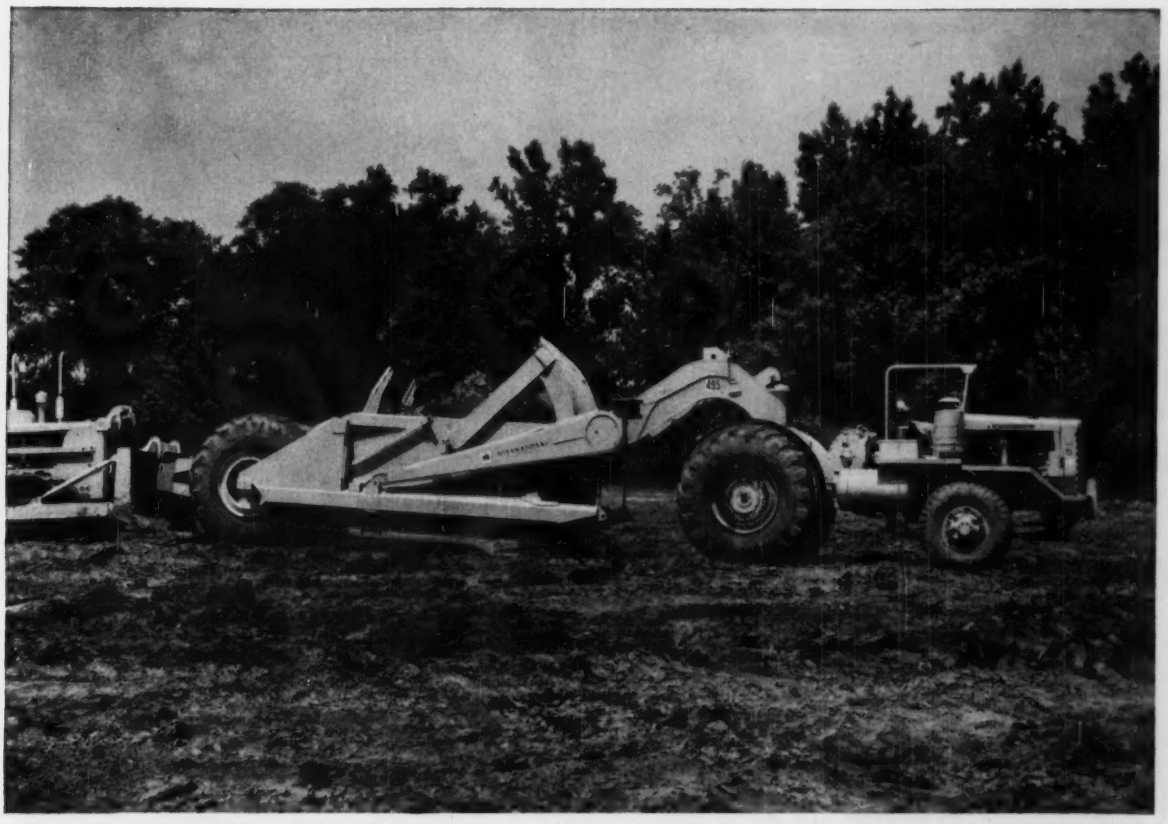
Prove the power-to-payload advantages the new rock-ribbed 65 Payhauler delivers! Compare the "65's" cycle-speeding combination of air-assist shifting; 11-second dumping, fast reversing; super-power braking; bonus-leverage, vibration-free power steering! And for 27-ton capacity, note how the 375-hp "95" leads the field. See your International Construction Equipment Distributor for a demonstration!

In only 11 seconds you dump the "65's" 19-ton load —with 3-stage, double-acting, constant-power hoist! Positive up-and-down snubbing guards against impact!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.



Geared with Fuller ROADRANGER... Three International Model 495 Payscrapers belonging to V. H. & M. Construction Co., Denham Springs, La., handle a total of 4500 to 5000 cu. yds. of material every 10½ hrs. in construction of Interstate Highway I-10 between Jennings and Egan, La.

Faster work cycles boost profits... COUNTERSHAFT BRAKE SPEEDS UPSHIFTS

Longer gear and bearing life with Pressure Filtration and Lubrication

Heavy rainfall and deeply-rutted, wet blue-clay surface have been major obstacles to the work of V. H. & M. Construction Company on a Louisiana highway project. Fighting weather, time and terrain, V. H. & M. handles a total of 4500 to 5000 cu. yds. every 10½ hours with 3 International Model 495 Payscrapers equipped with semi-automatic 9-speed Fuller R-1160 ROADRANGER Transmissions. Standard equipment on the R-1160 includes the Fuller Air-Powered Countershaft Brake and Pressure Lubrication and Oil Filtration System.

E. D. Pinkston, Superintendent, says, "Thanks to our Fuller-equipped Payscrapers, our production is very good despite miserable operating conditions and material which is extremely tough to handle. Our operators like the Fuller countershaft brake. It gives quick, easy upshifts without double clutching, keeps speeds up and cuts cycle time. And the pressure lubrication and filtration system prolongs gear and bearing life."

Ask your dealer about the off-highway Fuller Transmission . . . with countershaft brake and pressure filtration system as standard equipment . . . designed to put more profit in *your* operation.

FULLER — TRANSMISSION DIVISION — MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.
Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative

6 UNITS ABREAST FOR MAXIMUM COVERAGE
6 UNITS IN TANDEM FOR MAXIMUM ONE PASS CONSOLIDATION
4 UNITS (or it might be 5) TO EXACTLY FIT JOB WIDTH REQUIREMENTS
5 UNITS IN TANDEM AND STAGGERED, VARIABLE FOR A WIDE RANGE OF WIDTHS
4 UNITS TOWED AT SIDE OF TRACTOR. IDEAL FOR ONE PASS WIDENING OPERATIONS.
SHOULDER COMPACTION IS AUTOMATIC. End unit automatically assumes this position — no adjustment required. Prevents raveling.
*Attainable with optional equipment.
4200 3-TON VIBRATORY BLOWS PER MINUTE AND UNMATCHED VERSATILITY MAKE...

may be pushed or pulled by any prime mover capable of working speeds as low as 50 FPM; towed to location at any road speed; operated in either direction; controlled by prime mover operator. Two workheads, with as many as 4 units each may be employed, one ahead and one following trailer. Power plant supplies both single and 3-phase 110-115 volt, 60 cycle A.C. and has many uses.

JACKSON Your Best Bet for RAPID, MONEY-SAVING COMPACTION!

In laying macadam base courses of very coarse aggregate (¾" to 3½") for instance, a single spread 12" thick usually can be perfectly compacted with just two passes of a JACKSON COMPACTOR. Time required is just about one-half that required for rolling . . . and appreciable savings are effected by single course spreading. Fines can be laid in thicker layers, with no hand brooming required, and each spread thoroughly infiltrated in a single pass.

For compacting granular soils in practically all applications, JACKSON COMPACTORS are terrific economizers of both time and money . . . the most efficient and versatile machines in the compacting category. See them at your nearby JACKSON Distributor who has them both for sale and for rent. Literature on request.

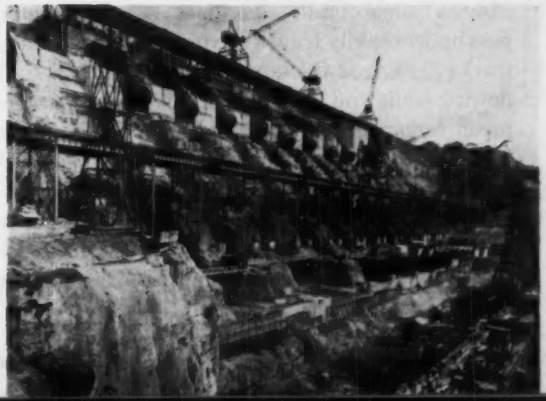
BOTH MACHINES OPERATE IN EITHER DIRECTION, NO TURNING REQUIRED

JACKSON VIBRATORS, INC.

LUDINGTON • MICHIGAN

Night Pour at Niagara

• Air-operated, 4-cu-yd Gar-Bro buckets pour concrete to encase the upper elbow of a penstock tube at the $98-million Niagara Generating Plant near Niagara Falls, N. Y. Merritt-Chapman & Scott Corp. pours about 90% of the concrete during the two night shifts; crews set forms and reinforcing steel on the day shift when visibility is better. So far M-C&S has poured nearly 600,000 of the 1,300,000 cu yd of concrete required. Three gantry-mounted American Revolver cranes handle the concrete buckets.



W. E. O'Neil Construction Company relies on Mobil Products and Mobil Contractor PM System for Complicated Expressway Interchange Project

Move a couple of railroad bridges . . . build an underpass under heavily traveled expressways and railroad tracks . . . and at the same time, keep all this traffic flowing while you work within a congested area not much larger than a football field. That's the job W. E. O'Neil Construction Company is doing for the Cook County, Ill., Department of Highways.

This tri-level grade separation project imposes a terrible strain on O'Neil equipment. Working under tight, severely restricted conditions calls for absolutely safe and sure protection . . . and O'Neil Construction Company gets it with Mobil products and the Mobil Contractor PM System.

You can assure your equipment the same effective protection against damaging wear-and-tear . . . help reduce breakdown possibilities that cut profits . . . and keep well ahead of job time schedules by specifying Mobil lubrication products and methods. There's a Mobil representative near you—why not see him today!

Limited working area of expressway interchange project is apparent in this close-up of O'Neil equipment on the job.

Dependable delivery of Mobil products helps O'Neil keep equipment lubrication schedules up-to-date at all times.

John A. Coyne, O'Neil Treasurer, and Mobil Fleet Sales Manager N. C. McPhee (left) discuss phases of the Mobil Contractor PM System that are helping to keep equipment in top working condition.

PHOTOS LEFT AND UPPER RIGHT COURTESY COOK COUNTY HIGHWAY DEPARTMENT OF ILLINOIS

CONTRACTOR PM SYSTEM INCLUDES:

1. **Record Folder**—provides identifying data for each separate piece of equipment and holds equipment records.
2. **Operator's Recommendation Chart**—lists the correct lubrication recommendations for each piece of equipment.
3. **Weekly Service & Inspection Chart**—an up-to-date record of condition of equipment, work to be done or completed.
4. **Delivery Ticket**—lists petroleum supplies delivered to equipment on the job.
5. **"Squawk" Sheet**—used by equipment operator to point out trouble spots that may need immediate attention.

This simple, yet effective system can pay off for you—ask us for information!

Mobil

MOBIL OIL COMPANY

A Division of Socony Mobil Oil Company, Inc.
150 East 42nd Street, New York 17, N. Y.

on saving money at every turn of the road...

the MASSEY-FERGUSON 406 TRACTOR SHOVEL *speaks for itself:*

"I HAVE DONE... CAN DO!"

The Massey-Ferguson 406 can do the same for you — in making a profit and reducing equipment costs — as it has done for others!

Saves time! Speedy *"Instant Reverse"* allows fast in-and-out maneuvering.

Full loads! Handles 1 cu. yd. (SAE rated) with ease because of direct thrust from low pivot points and 9300 lbs. pryout power.

High dump! Telescoping arms clear 126" at hinge point.

Maximum visibility! Operator is positioned to see front, rear, and both sides for maximum efficiency and safety.

More jobs! Handles both big and little at a profit. Numerous attachments — including famous Massey-Ferguson Backhoe — give low-cost versatility.

Costs less to own! Compare and you'll see!

featuring **INSTANT REVERSE** with **TORQUE CONVERTER**

Go Forward or Back... at a Touch of your Toe!

NO SHIFTING...NO CLUTCHING...NO LEVERS TO PULL

Instant Reverse is found only in Massey-Ferguson Industrial Equipment. Just press one foot pedal to go forward . . . switch to another to go reverse. Acceleration is built in each pedal. Has five different speeds — equal in each direction so you can pre-select proper gear range for each job. A demonstration will quickly show you its many advantages.

Why Wait? — Set a Date — We'll Demonstrate!

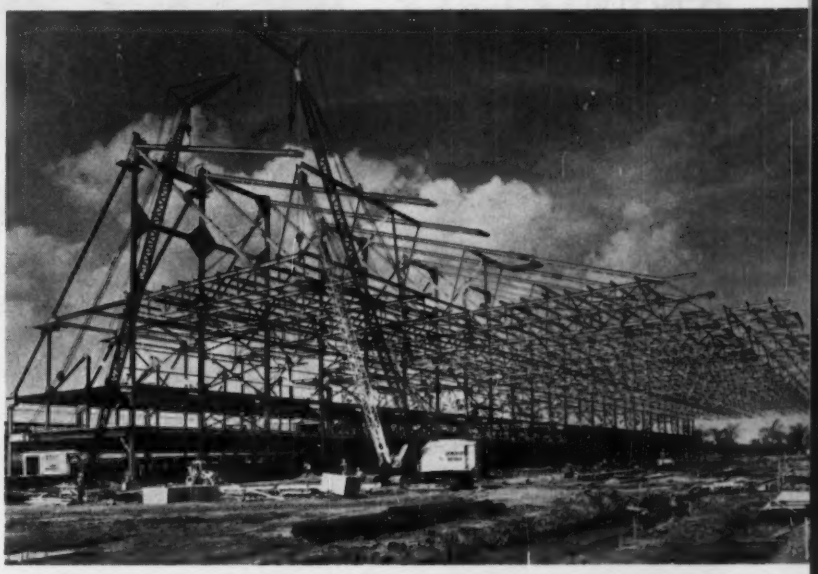
MASSEY-FERGUSON INDUSTRIAL DIVISION

Block 1000 South West St., Wichita 13, Kansas

Producing Sizeable Power for the "Sensational 60's"

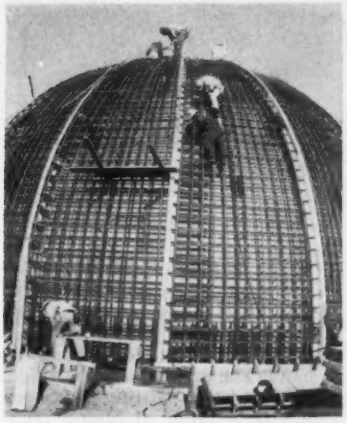
MF 60-4

Construction News in Pictures . . .



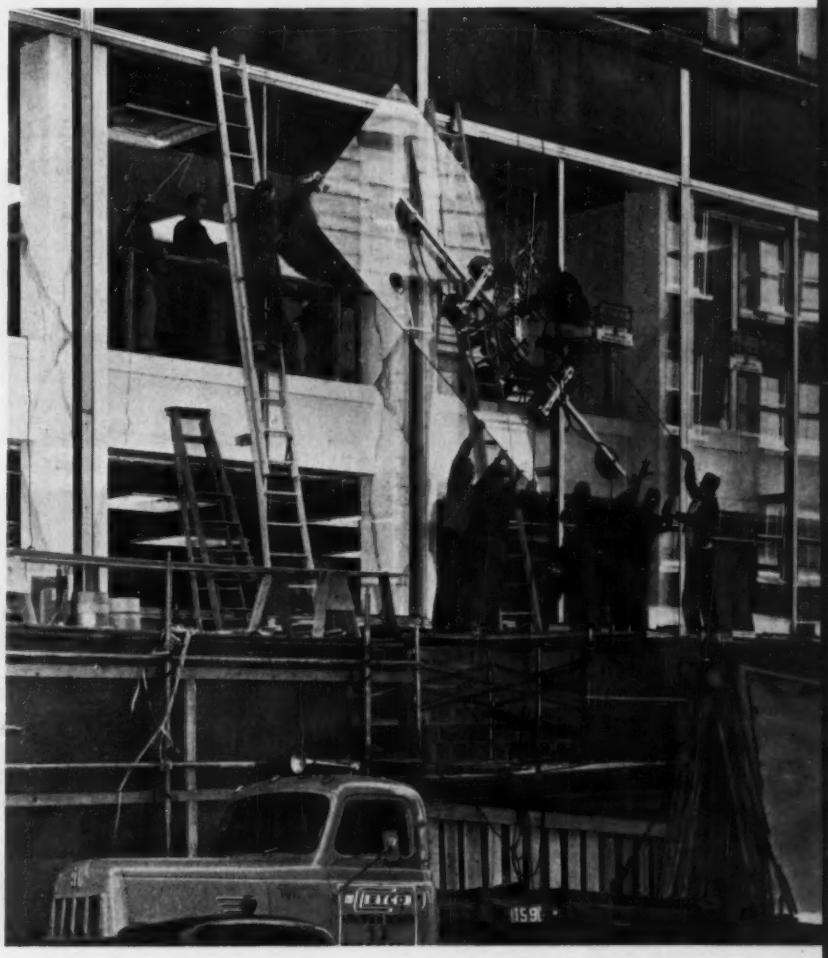
Shelter for Planes

Roof of this Trans-Canada Air Lines hangar near Montreal cantilevers out 175 ft from the main columns. It is composed of 28 trusses supported by suspension bars that are pin-connected to the top chords of the trusses and to the columns so the roof can deflect under wind or snow loads. Dominion Bridge Co., Ltd., is erecting the steel.



Missile-Age Building

Workmen tie in heavy reinforcing for a blockhouse at Cape Canaveral, Fla., from which missile firings will be controlled. It has an inside radius of 25 ft, 9 in., and its walls vary from 21 in. thick at the base to 17 in. thick at the top. It is one of several structures George A. Fuller Co. is building under a $5.3-million contract.



Faster, Safer

Glazier, riding a rig like a bosun's chair, operates a ratchet device to position an 800-lb pane of glass. Pittsburgh Plate Glass Co. used the bosun's chair with a Vac-U-Mation glass lifter to simplify installation of thirty 7x17-ft panes of glass for a building in Kansas City. A crane lifts the complete outfit to second-story level.

continued on next page

Flood Control

Manitowoc dragline with 6-yd bucket works around the clock to deepen the spillway through the massive earth slide across Madison River in Montana. An earthquake last August dumped 40,000,000 cu yd of earth across the river. The spillway must be deepened to lower the level of the lake behind the slide before the spring run-off.

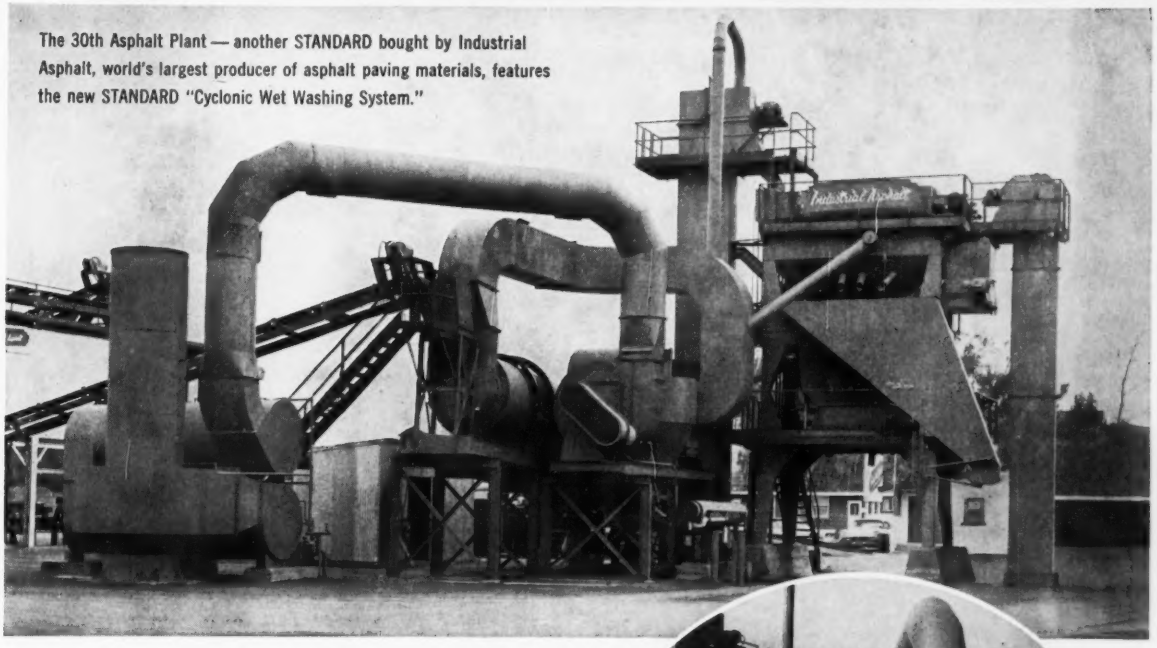
Undercover Digger

Draglines do most of the work of deepening Little River Canal near Miami, Fla., but a Gradall mounted on two barges bolted together comes in handy for digging under bridges where there is little headroom. Troup Bros., Inc., of Miami move the rig with a small boat powered by an outboard engine and hold it in digging position with spuds.

Fast-Moving Fleet

Each of Torrington Construction Company's eight Caterpillar DW21 scrapers moved an average of 1,600 cu yd of sandy soil a day before heavy snows closed the job down in late December. Torrington has completed about half of the 2,600,000 cu yd of earthmoving included in a $4.8-million contract for a section of highway near Glen Falls, N. Y.

CLEAN!



The 30th Asphalt Plant — another STANDARD bought by Industrial Asphalt, world's largest producer of asphalt paving materials, features the new STANDARD "Cyclonic Wet Washing System."

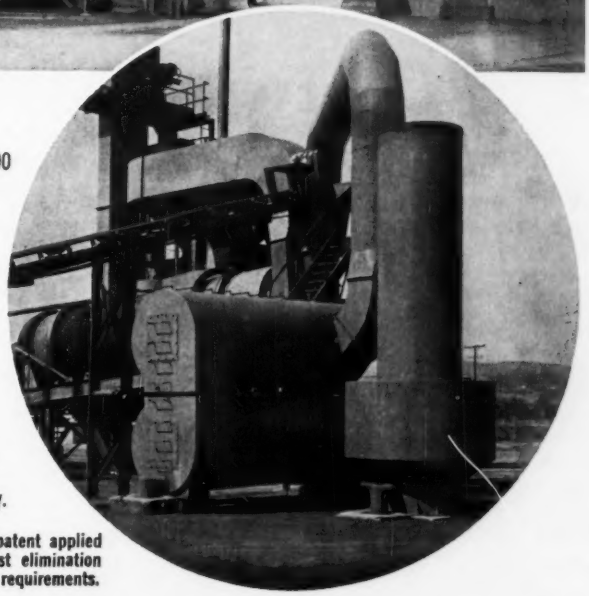
AMERICA'S CLEANEST ASPHALT PLANTS

Shown above is Industrial Asphalt's new STANDARD Model R-M 4000 pound Asphalt Plant, located in Escondido, California.

Fully equipped with the latest STANDARD improvements including the new "Cyclonic Wet Washer," this plant has been in daily production for some time, producing as high as 180 tons of hot mix per hour.

TODAY . . . see your STANDARD distributor! He can tell you in detail about all the many features of the STANDARD Asphalt Plants which add up to: lowest cost erection, lowest cost operation, lowest cost maintenance, plus highest tonnages — size for size.

STANDARD Asphalt Plants range in size from 1000-8000 lb. capacity.



STANDARD's new "Cyclonic Wet Washer" (patent applied for) assures added dust collection and dust elimination efficiency — meets all known air pollution requirements.

STANDARD
ASPHALT PLANTS
THE WORLD'S FINEST

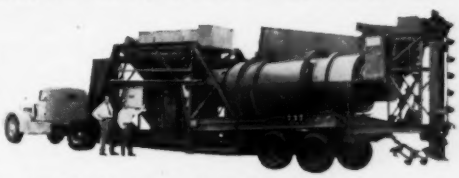
STANDARD STEEL CORPORATION
General Offices & Plant, 5089 Boyle Avenue, Los Angeles 58, California
Midwest Offices & Plant **LEADER IRON WORKS** *Decatur 89, Illinois*
(Division of Standard Steel Corporation)

. . . built to do a better job!

PARTS WAREHOUSES IN LOS ANGELES AND DECATUR, ILLINOIS

Attention Contractors! **The New STANDARD**

PORTABLE T. M. PLANT offers top production. A *complete* self-contained batch type Asphalt Plant... on wheels. One man operates! Has exclusive "SELF-LIFT" erecting device. RUGGED – ECONOMICAL – SIMPLE. Mixes up to 80 tons per hour!



ROTARY DRYERS • KILNS • COOLERS • ASPHALT PLANTS

Men take cover behind equipment during blasting at Barkley Dam Project.

Barkley Dam contractor protects $2,000,000 worth of

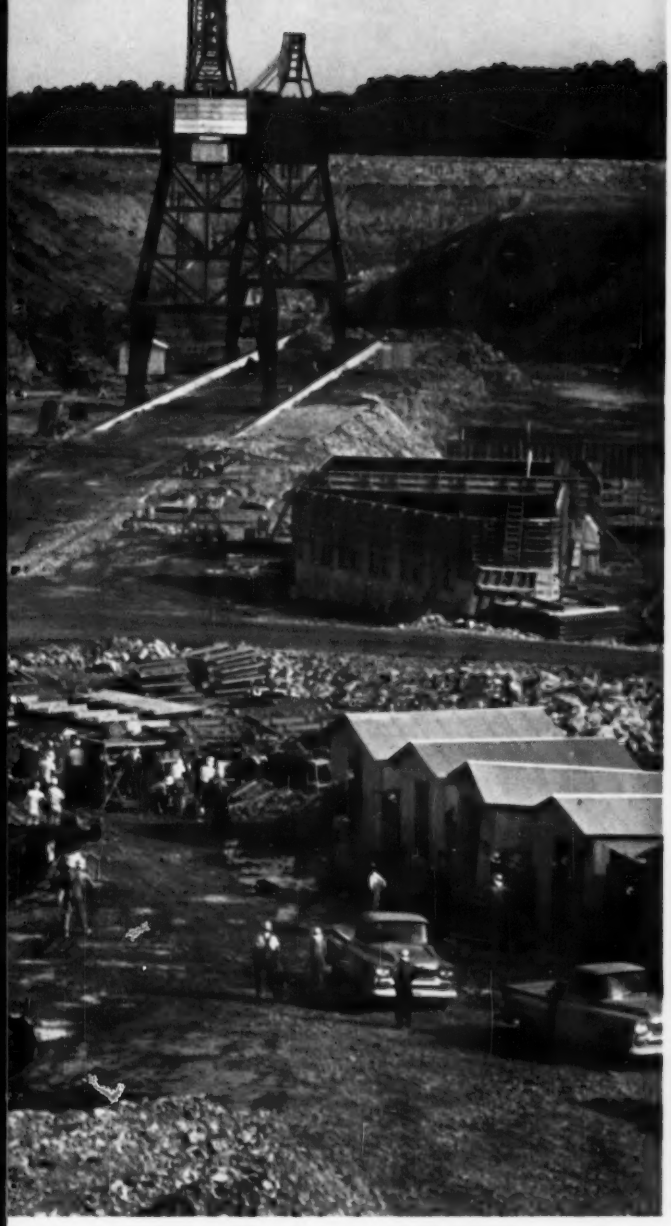
GULF MAKES THINGS

Barkley Dam is a key unit of the vast Barkley Project—the development of the Cumberland River Basin for flood control, navigation improvement, and the production of hydroelectric power.

Tecon Corporation of Dallas, Texas, is building the lock and canal for improvement of navigation between the Cumberland and Tennessee rivers in Kentucky. Their $16,700,000 contract calls for the construction of a lock with a chamber having a clear dimension of 110 by 800 feet, and a normal lift of 52 feet. Some million cubic yards of dirt and rock must be moved and 550,000 yards of concrete poured. Equipment, assembled at the job site, is worth about $2,000,000.

John O'Hearn, Project Manager of Tecon, is in charge of the lock and canal construction. "One of the first moves we made on this project was to set up a simplified routine to protect our equipment through proper lubrication," he says. "A Gulf Engineer made a survey of our equipment, and came up with a program to lubricate virtually everything with three basic Gulf lubricants.

"Our only crankcase lubricant is Gulf Super Duty Motor Oil. Our one general purpose grease is Gulfcrown



Consolidation of Gulf lubricants in a central supply area helps speed up equipment servicing on major projects like this one.

John O'Hearn (left), Project Manager, Tecon Corporation, Dallas, Texas, discusses equipment performance on the job with S. P. McCracken, Gulf Sales Engineer.

equipment with only 3 Gulf lubricants . . .

RUN BETTER!

Grease E.P. And our basic gear lubricant—for everything from gear boxes on shovels to enclosed gears in concrete mixers—is Gulf Multi-Purpose Gear Lubricant.

"A simplification program like this results in more than just good lubrication," says Mr. O'Hearn. "The engineering help we get from Gulf—plus prompt deliveries—add up to a lot of extra dollars in our pockets."

On your next project, see how Gulf makes things run better! Meanwhile, just call your nearest Gulf office, or write for 88-page "Gulf Contractors' Guide"—the maintenance "bible" for heavy equipment.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

Please send latest edition of "Gulf Contractors' Guide."

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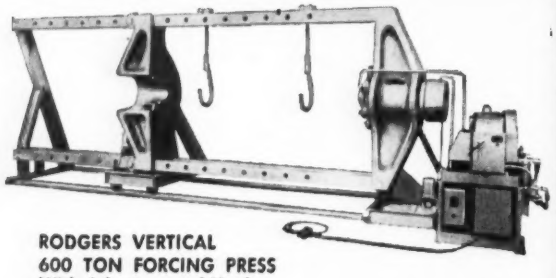
SP 9718

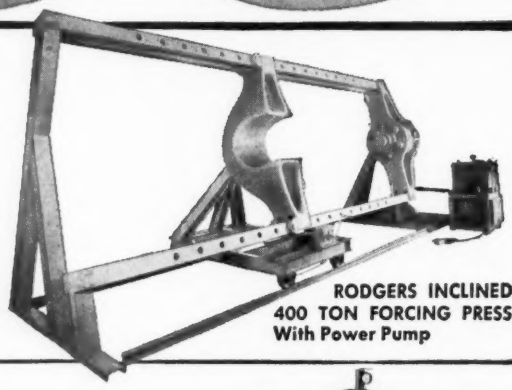
THE MOST FOR YOUR MONEY!...

Rodgers Forcing Presses

Greater Versatility — Rugged Power — Flexible Controls

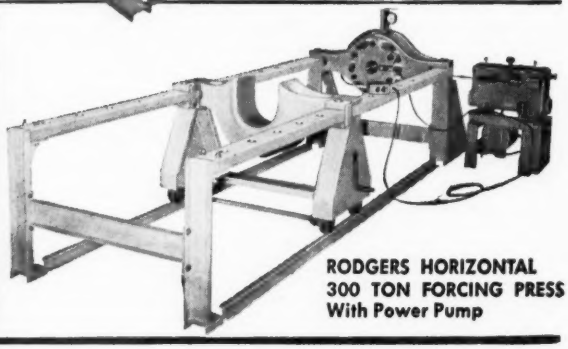


RODGERS VERTICAL
600 TON FORCING PRESS
With Adaptors and Hooks



RODGERS INCLINED
400 TON FORCING PRESS
With Power Pump

RODGERS PORTABLE
100 TON FORCING PRESS
With Hand Pump



RODGERS HORIZONTAL
300 TON FORCING PRESS
With Power Pump

When you buy a Rodgers Forcing Press, you are not tying up your money in a single purpose tool. Compared with other presses, Rodgers design permits a wider variety of jobs to be handled—from the full tonnage capacity of the press, on heavy duty work, to partial capacities required for light jobs.

Rodgers Press design also offers unique flexibility in the interchangeability of cylinders and power source. Each press can be easily modified to suit changing job requirements. And an "extra" feature is the simple way the cylinder and pump may be detached for jacking, pulling and pressing work in the shop or field. Rodgers positive, accurate controls may be used at the press or remote.

When you check Rodgers Forcing Presses, feature for feature, their rugged construction, fast, positive action, and the variety of adaptors, hooks and other accessories available, you will be convinced that a Rodgers will give you the *most* for your money.

Rodgers Forcing Presses are available in standard, horizontal, vertical, inclined and portable models... capacities from 100 to 600 tons... with power or hand pumps.

Write for Catalog No. 315A... it gives complete details and specifications.

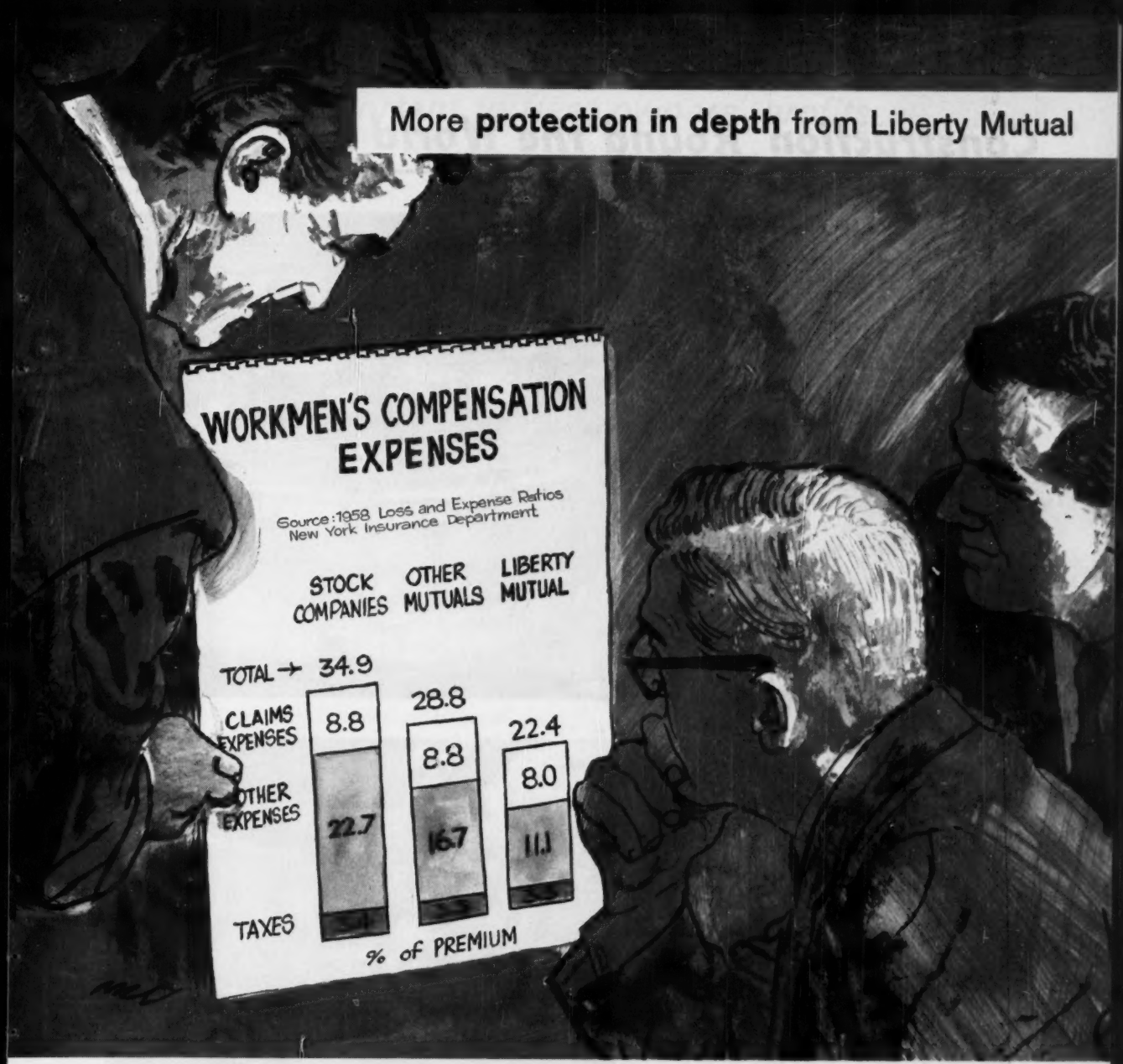
HYDRAULICS Rodgers KEEP THE WORLD MOVING

RODGERS HYDRAULIC, Inc.

Pioneers in High Pressure Hydraulics Since 1932

7403 Walker Street • Minneapolis 26, Minnesota

More **protection in depth** from Liberty Mutual



Why your insurance costs go down when Liberty Mutual handles your workmen's compensation

The price you pay for workmen's compensation insurance hinges directly on the cost of accidents and losses and your insurance company's cost of doing business.

Through protection in depth Liberty Mutual not only helps you prevent accidents, but lessens their impact when they occur. Added to this forward-looking concept of loss control is Liberty's outstanding record for keeping operating expenses at a minimum. Year in, year out, these expenses are lower than the average for all companies (as shown by 1958 Loss and Expense Ratios — New York Insurance Department).

Important? In the year 1958 Liberty's workmen's compensation policyholders received $22,900,000 in savings — $4.8 million under retrospective rating plans and $18.1 million in dividends. We have also helped many policyholders earn experience rating credits which will reduce their future premiums. Liberty Mutual policyholders enjoy premium discounts allowed under rating plans in the amount of a little more than $3 million.

Such savings have helped make Liberty Mutual the leading writer of workmen's compensation insurance every year since 1936.

Want to see your compensation costs go down? Write or phone your nearest Liberty Mutual office. There are 146 of them located all across the country.

Look for more from

LIBERTY MUTUAL

...the company that stands by you

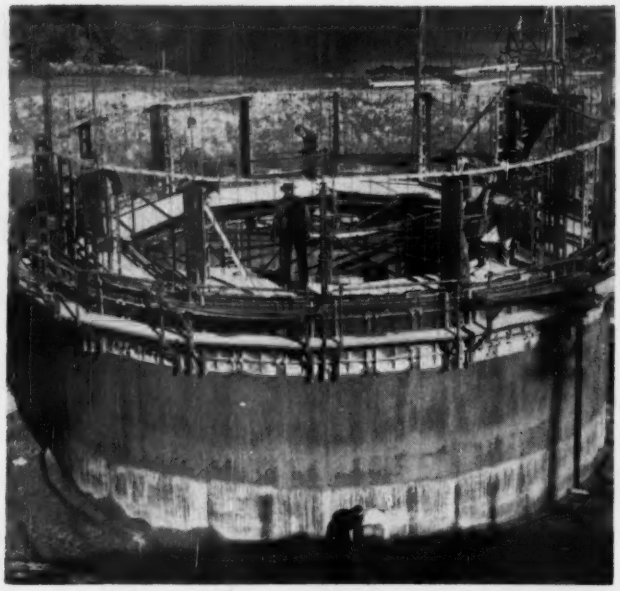
LIBERTY MUTUAL INSURANCE CO. • LIBERTY MUTUAL FIRE INSURANCE CO. • HOME OFFICE: BOSTON

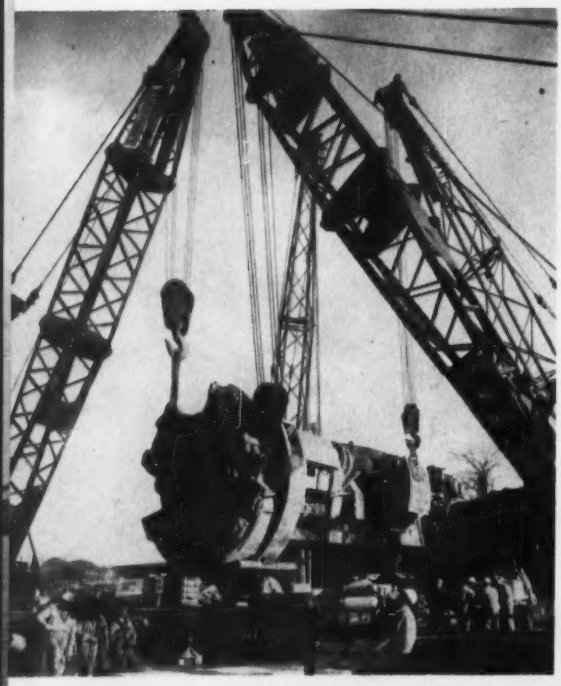
Business Insurance: Workmen's Compensation, Liability, Group Accident and Health, Fire, Fleet and Crime
Personal Insurance: Automobile, Fire, Inland Marine, Burglary, Homeowners'

Construction 'Round the World . . .

In New Zealand

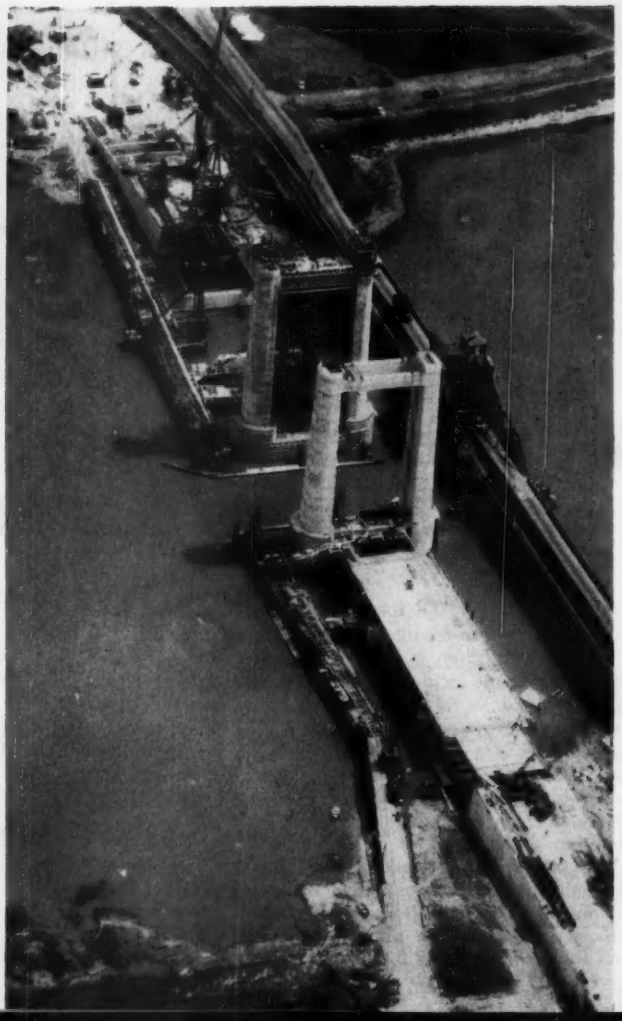
Concrete sewage treatment tank rises near Auckland, constructed with slip forms that rise at rate of 6 in. per hr. Working around clock, a crew of 44 men completed concreting in three days. The tank, one of two being built by the Ministry of Public Works, requires 71 cu yd of concrete. It is 35 ft in dia, 24 ft high, and 10 in. thick.





In Canada

Four cranes hoist 60-ton mechanicale mole through an open cut during construction of sewer tunnel near Toronto. Foundation Company of Ontario, contractors, call it "Foundation Humber" because it bored tunnel 12,000 ft long and 11 ft in dia along bank of Humber River. Mole worked quietly 35 to 100 ft under built-up area.



In Great Britain

Kingsferry Bridge, one of United Kingdom's largest post-war lift bridges, nears completion across River Swale between Kent mainland and Isle of Sheppey. When completed, reinforced concrete towers, 100 ft high, will raise center span 95 ft above high water mark. The structure is 650 ft long and 50 ft wide. It cost $2,800,000.

Vitally important to fleet owners' profits

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Actual records from millions of miles of use under most severe conditions prove this high tensile carbon steel wire cord gives truck tires *more than twice the life of tires made with textile cord.* In many cases, tires have gone as much as 300,000 miles on original treads!

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This new, free booklet is yours for the asking. It explains why tires made with Bekaert Steel Wire Cord are virtually indestructible, yet sacrifice none of the resiliency of textile cord. It describes constructions which enable leading truck tire manufacturers to offer unparalleled protection against blowouts, cutting and curb damage. It shows how Bekaert Steel Wire Cord lets tires run up to 125 degrees cooler . . . tells how you get better traction, higher load carrying capacity and less power loss with tires made with Bekaert Steel Wire Cord.

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4-wheel tractor-scraper with Hi-Torque brakes

Heavy rear dump with Hi-Torque brakes

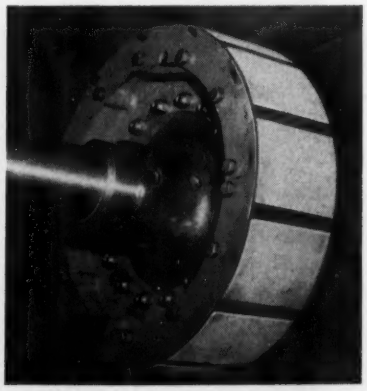
For your heavyweight vehicles get double braking power with Hi-Torque brakes

Operators of heavy off-road vehicles are finding that Hi-Torque brakes boost their profits—and that's a feature to consider when choosing *your* heavy equipment.

Hi-Torque brakes give the "heavyweights" adequate safety and controllability—stop vehicles in approximately half the distance required for conventional two-shoe brakes. With this reserve braking power, cycle time can be reduced as equipment is operated in higher gear. Operators can tackle grades usually considered unsafe, since Hi-Torque brakes don't fade, will stop a fully loaded vehicle downhill!

Specify Hi-Torque brakes on your equipment—ask the vehicle manufacturer for details. Or write *B. F. Goodrich Aviation Products, a division of The B. F. Goodrich Company, Dept. CM-2, Troy, Ohio.*

2-wheel tractor with Hi-Torque brakes



Full circle contact with drum is provided by Hi-Torque brakes giving maximum effective braking surface in the same size unit. Hi-Torque stops vehicles twice as fast as conventional brakes.

B.F.Goodrich

Hi-Torque brakes

Construction Methods AND EQUIPMENT

FEBRUARY, 1960

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HENRY T. PEREZ, Editor

Help for Highways

"BETTER HIGHWAYS NOW — Save Lives, Save Time, Save Money." With this as its slogan, a Better Highways Information Committee has set out to coordinate and administer a plan of grass roots public education to explain the highway construction program in positive terms.

The committee was organized, after much preliminary planning, during the American Road Builders' Association's annual meeting last month. But representation is not limited to ARBA. The committee is seeking the broadest base of support possible by merging ARBA's interests with those of other groups (such as the Associated General Contractors) who are seeking an adequate, stable highway program.

The project the committee is undertaking—improving public recognition of highway needs, problems, and construction progress—is long overdue. Otherwise, newspapers such as the Wall Street Journal would not mistakenly editorialize on the road program as "a vast program thrown together, imperfectly conceived, and grossly mismanaged, and in due course becoming a veritable playground for extravagance, waste, and corruption." This indictment is just not true.

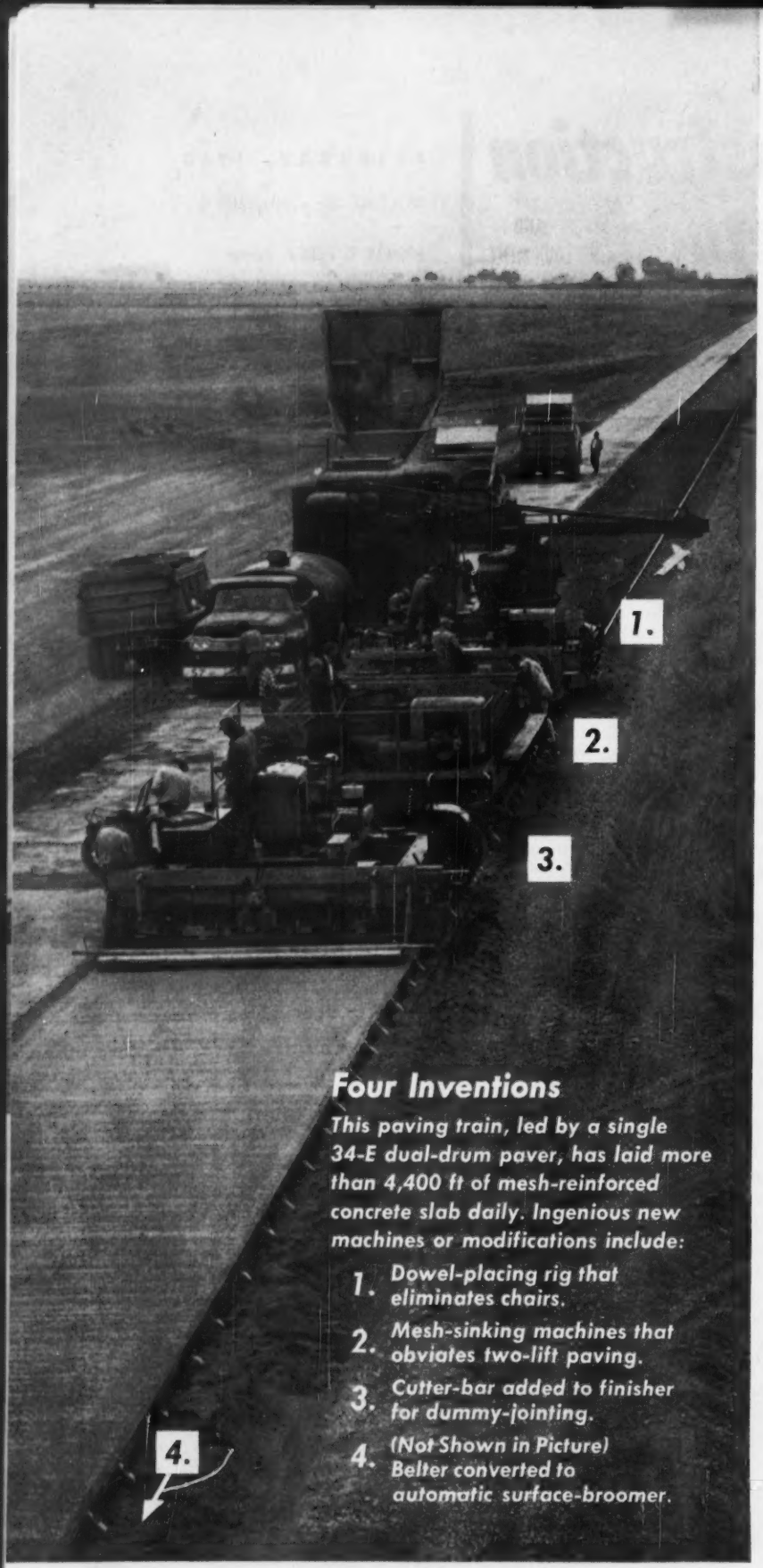
The situation will probably get worse, despite efforts of the new information committee. Without the committee, however, there might be chaos. That's because two Congressional subcommittees and one appointed by the Administration are about to hold hearings and investigate various phases of the highway program. A. E. Johnson, executive secretary of the American Association of State Highway Officials put it this way in addressing the ARBA meeting:

"They [investigations] are in the hands of sincere and objective people, and I look for some constructive things to come from them. Since the road program is a massive project and since this is a political year, I expect some irresponsible charges to be made by persons enjoying official immunity from having to substantiate their charges, that can hurt the highway program.

"It is unlikely that a sensational press will devote much time or space to praising the excellent job being done by the big majority of the people involved, but will stress those few scandals or irregularities that might be disclosed."

Well, the information committee's job is to see that the public and the public press do get the facts and, more importantly, are able to understand and interpret them in the light of the over-all highway program. Its job, too, is to explain the highway program's important relationship to the economy of the country as a whole.

The committee is a vital one for anyone who has a stake in any phase of the construction industry, whether directly connected with roadbuilding or not. It behooves each of us to give it all the support and encouragement we can. Remember, its slogan is not an empty one: *"Better Highways NOW — Save Lives, Save Time, Save Money."*



Four Inventions

This paving train, led by a single 34-E dual-drum paver, has laid more than 4,400 ft of mesh-reinforced concrete slab daily. Ingenious new machines or modifications include:

1. *Dowel-placing rig that eliminates chairs.*
2. *Mesh-sinking machines that obviates two-lift paving.*
3. *Cutter-bar added to finisher for dummy-jointing.*
4. *(Not Shown in Picture) Belter converted to automatic surface-broomer.*

New Rigs

Contractor-built machines sink dowels and reinforcing mesh into fresh concrete dumped to full slab depth in one pass of a paver. They increase paving speed 100 ft per hr laying 8-in. by 12-ft slab.

THE MOTTO of Roy L. Houck, Oregon contractor, might well be the same as Thomas A. Edison's: "There's a way to do it better—find it!" For, dissatisfied with conventional methods of paving mesh-reinforced concrete highways, the Salem roadbuilder has developed a new technique that ups his progress 33%.

Basically the scheme is simple: Pour the full slab thickness in a single lift, then vibrate the reinforcing mesh down to correct depth in the fresh concrete. This procedure eliminates the backtracking necessary when first dumping and spreading concrete to mesh level, placing mesh, and then dumping and spreading the final lift. With his new system, Houck gains an extra 10 to 15 min of productive time for his paving train each hour.

But to make his scheme practicable, Houck had to design and build a mesh-sinking machine. While he was at it he constructed another rig for placing contraction-joint dowels in the fresh, full-depth concrete. He also devised a vibratory joint-cutter for his finishing machine. And, for good measure, the inventive contractor rebuilt a belting machine into an automatic broom that gives the slab its final textured surface.

It all began in 1958 when R. L. Houck & Sons Corp. paved 9 mi of Interstate Route 5 near Albany, Ore. Pavement consisted of two

Pave Reinforced Slab in One Lift

1. Dowel Inserter Follows Spreader That Strikes Mix At Top of Forms.

12-ft slabs 8 in. thick, reinforced by 6x12-1/4 welded wire mesh 2½ in. down from the surface.

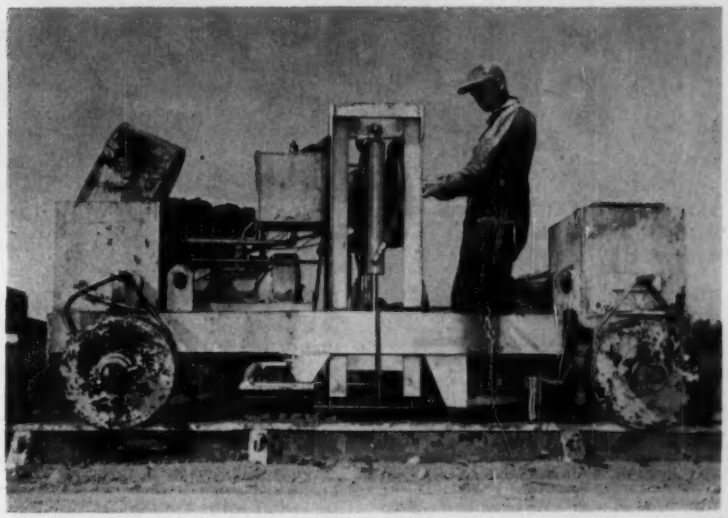
Houck paved this in the ordinary two-lift manner. But he was unhappy with jointing procedure and job progress. So, over the winter, in his own shop, he built his machines for single-lift paving.

The payoff came this past season when Houck was awarded an additional 7 mi of paving on Route 5. According to Glenn S. Paxson, assistant state highway engineer, "Our observations indicate his rate of paving in 1959 was about one-third greater than on the 1958 project. The conditions under which the work was done were practically identical. The faster progress can be principally attributed to the novel equipment." Here's how the equipment works:

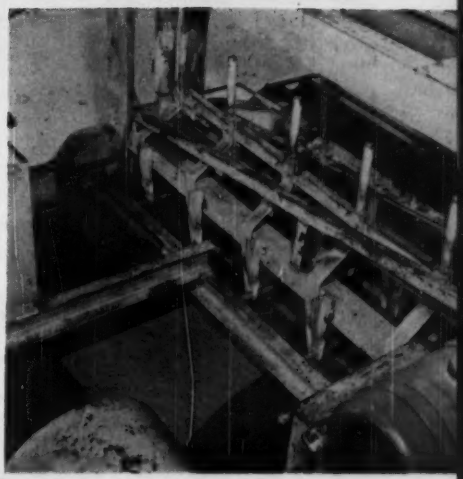
Leading the paving train is a Rex 34-E dual-drum paver. A Blaw-Knox spreader follows it to distribute the dumped concrete, vibrate the mix, and strike it off at the top of the forms. Close behind the spreader comes the machine that sets 1x18-in. dowels on 12-in. centers for the contraction joints.

Dowel-Setting Machine

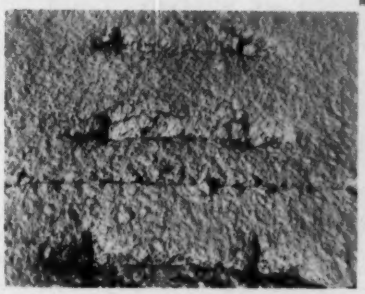
The dowel setter rides the forms on double-flanged wheels and is self-propelled. A 6-hp Wisconsin air-cooled engine powers it, working through a Ford trans-



RIG RIDES FORMS — Gasoline engine drives dowel machine that is operated by one man. While moving between contraction joints on 61½-ft centers, operator greases 1x18-in. dowel bars and inserts them in rack that forces them into place in the slab. End guides keep assembly straight.

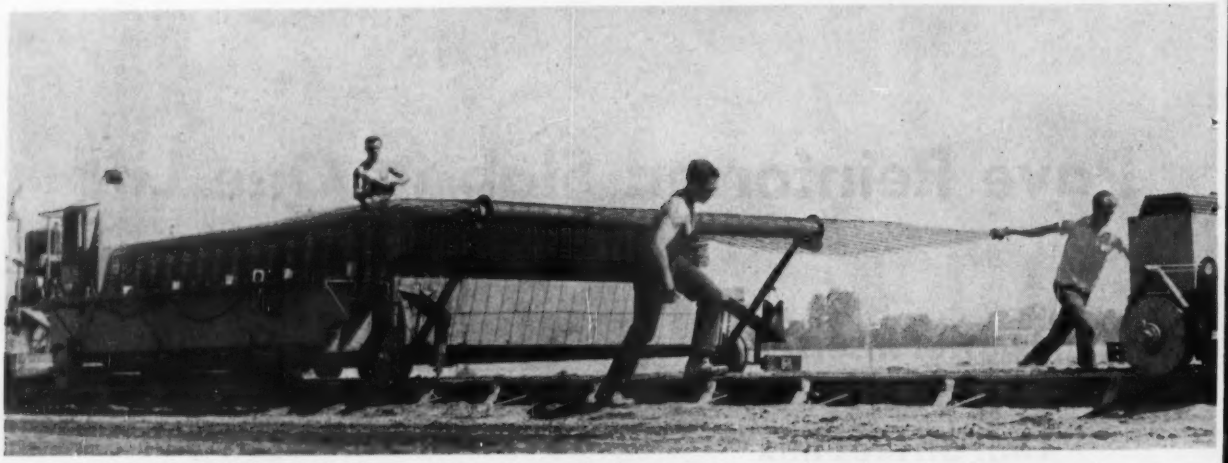


FINGERS HOLD DOWELS—Movable prongs grip bars near their ends, are released simultaneously after hydraulic rams have embedded the dowels.



PROCESS LEAVES IMPRINTS—Marks in slab surface show where dowels have been inserted, but following finisher and float restore normal concrete.

2. Mesh-Placer Follows Dowel Rig



KEY TO SINGLE-LIFT PAVING—Mesh-sinking machine carries stack of reinforcing that is pulled over idler roller onto slab. Inside the rig's carriage is a frame that positions the mesh panel in the concrete by hydraulic pressure and heavy vibration.

mission and rear end. On the machine is a frame-like rack that holds the dowels, and two Be-Ge double-acting vertical hydraulic rams that force rack and dowels into the concrete to mid-depth of the slab.

The rack is fitted with a series of clamps that grip each dowel near its ends. Each clamp encircles the dowel like a thumb and forefinger. The thumb is fixed. But the moveable finger is fastened to a spring-loaded lever arm that tends to keep it closed, yet can be opened individually by the machine operator for insertion of a dowel. Dowels are heavily greased prior to insertion to prevent bond with the concrete.

When the rack has been loaded with all dowels for a joint, the rams push the assembly down into the slab. An adjustable stop assures correct depth of embedment. Then the operator, through another lever, trips all fingers simultaneously so the rams can retract the rack alone, leaving the dowels embedded in the concrete.

The dowel-setting machine eliminates the comparatively expensive steel chairs, which had to be placed by two men, that Houck used on his earlier job. It also prevents dowels being shifted out of place by dumped concrete, as had happened previously. Comments Oregon's Paxson, "We are confident that the results [with the machine] are superior to those obtained by the use of chairs."

Mesh-Placing Machine

Following close behind the dowel setter comes the mesh-placing machine. This, too, is self-propelled on the forms, driven by a 6-cyl Ford 107-bhp industrial engine.

The rig's carriage is about 20 ft long. Four Be-Ge double-acting hydraulic rams inside the carriage suspend an 11x18-ft steel frame that sinks the reinforcing mesh into the fresh concrete.

The frame that contacts the mesh is made of 3x3-in. steel angles with one leg down. Longitudinal members at each side are connected by 10 transverse members on 2-ft centers. A superimposed I-beam running lengthwise strengthens the frame near each of the two quarter points. And angle braces running from the tops of the beams down to the center and sides of the frame give additional rigidity.

Near the ends of the I-beams are the hydraulic rams that actuate the device. And because simultaneous pressure and vibration are necessary to sink the reinforcing mesh into place, alongside each ram is a Jackson vibrator giving a 9,000-lb impact. Two Jackson 110-v generators on the machine power the four vibrators, which were taken from earth compactors.

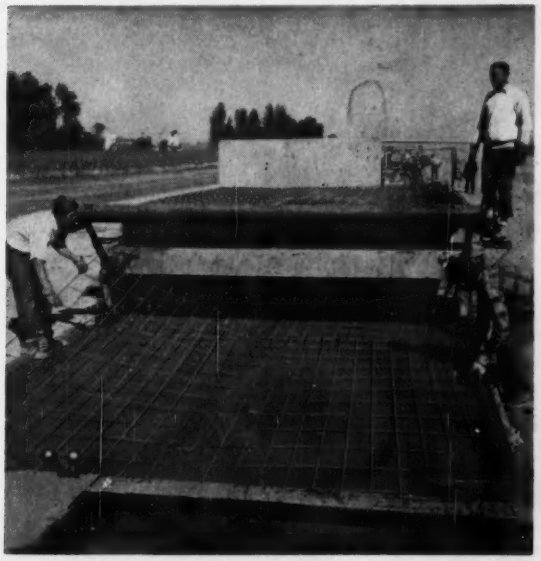
Also on the top of the machine is a supply of the 6x12-1/4 mesh. Colorado Fuel & Iron Co. supplies it in 11½x16-ft panels. As needed, a panel is pulled off the top of the supply stack, over a front idler roller, and down onto the slab surface. There it is lapped 12 in. over the previously placed panel.

Then the machine moves forward to straddle the lap and sink the forward half of the next-to-last panel and the rear half of the last panel into place at the same time. (This procedure leaves the leading edge of the partially embedded panel exposed to assure correct lapping.) When the mesh is at correct 2½-in. depth, limit-chains between carriage and sinking frame prevent it from going deeper. Then the rams retract the frame so the cycle can be repeated.

As you would expect, insertion of dowels and mesh and removal of their sinking apparatus leaves the surface of the fresh concrete quite rough. But a Rex double-screed finisher, following close behind the mesh-placing machine, smooths the slab without difficulty.

On the rear of the finisher, Houck has added a transverse blade to make a weakened plane above the contraction-joint dowels. Vibrated and pressed into the slab by twin hydraulic cylinders, the blade cuts a square-edged groove into which two workmen insert a precut mastic strip.

Some distance behind the finisher comes a Johnson float that imparts final smoothness to the slab. And this is followed by a brooming-curing machine. To



MESH PLACEMENT—Workmen set the 11½x16-ft- panel of reinforcing to lap previous panel by 1 ft. Rig next advances to sink it.

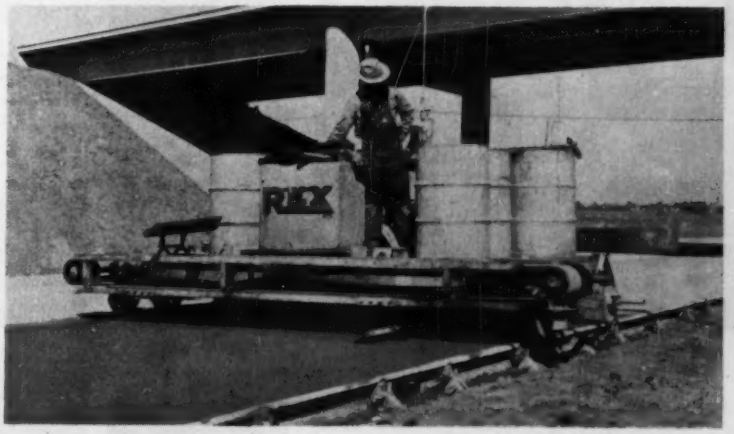
SLAB SURFACE—After mesh has been sunk in slab, its pattern shows, but cores indicate no segregation or weakened mortar planes.

convert it from a Rex belter, Houck raised the belt frame and fastened two steel-bristled brushes to a transverse endless belt. While the brooms texture the concrete at the front of the machine, an automatic spray applies Norris white-pigmented curing compound at the rear to complete the paving operation.

Houck has applied for patents on his dowel and mesh machines. He's paved more than 230,000 sq yd with the equipment so far and is proud of the results. Forrest Cooper, deputy state highway engineer, agrees: "The Houck method of mesh laying and dowel insertion has met all our standards for concrete paving and in practice has demonstrated a considerable increment in efficiency. There is evidence also that the additional vibratory action may produce a superior pavement. So far we have been completely satisfied with the results."

This is concurred in by Oregon's Paxson: "We, as engineers, are pleased that he speeded up his job and increased his profit. We believe that we received a better product due to the equipment that he developed. While this equipment has as yet been used only on 12-ft-lane construction, the same general type of equipment could be built for 24-ft widths. We feel that Mr. Houck has made a worth-while improvement in the procedure for building reinforced concrete pavements."

3. Jointer After hydraulic rams on rear of finisher have pushed vibrating bar into slab, men insert mastic into formed slot.



4. Surfacer Contractor converted belting machine to broomer by raising frame, adding brushes to belt. Rig also spray-cures slab.

A slurry mixture made of bentonite clay and water holds the vertical walls of trenches dug to place impervious cutoff walls beneath both earth embankments and cellular cofferdams at Wanapum Dam. The method is getting the contractor off on a bonus-winning schedule.

Slurry Supports Cutoff Trench Walls

A BENTONITE SLURRY supports the walls of cutoff trenches at Wanapum Dam in Washington.

This is its first application to dam construction, but slurries have been widely used in oil well drilling.

The slurry is a mixture of water and bentonite clay, a fine moisture adsorbing material. Water and bentonite, when thoroughly mixed, form an emulsion slightly heavier than water. In a trench under excavation the slurry both supports the walls of the trench and forms a waterproof coating on them to prevent the entrance of ground water.

Specs require Grant County Constructors, the joint venture contractor on the job, to use the slurry method in placing the cutoff wall beneath the 5,400-ft-long earth embankment portions of the dam. The contractor decided to use it also to put a cutoff trench beneath the 4,000-ft-long cellular cofferdam enclosing the work area on the west bank of the Columbia River.

Contractor's Choice

A deep bed of gravel overlying bedrock complicates cofferdam construction. Grouting this gravel would have been very expensive; driving sheetpiling through it to bedrock would have been difficult and time-consuming. So the contractor elected to

EXCAVATING—Manitowoc crane excavates trench with 4½-yd drag-bucket fitted with false bottom to increase digging angle and teeth on heel to rip material.

PROBING—Air probe rings like a bell on hitting exposed bedrock. It agitates slurry and loosens last remaining earth particles clinging to bedrock.

SEALING—A P&H truck crane with 4-yd air-operated Gar-Bro bucket places concrete for 3-ft-thick seal to block off seepage through crevices in bedrock.

DEEP DITCH—Cutoff trenches cut through gravel overlying bedrock are as much as 80 ft deep. Slurry holds walls during excavation, then binds backfill into impervious wall.

place a cutoff wall from bedrock to near the top of the gravel. Slurry holds the walls of the trench during excavation and then combines with the backfill material to create an impervious cutoff wall. The steel cell cofferdam will straddle the impervious cutoff wall.

They chose the slurry method mainly to save time. They are eager to match the construction pace that is winning a $4-million bonus for Merritt-Chapman & Scott Corp. on Priest Rapids Dam, a sister structure a few miles downstream.

The contract calls for a maximum bonus of $3.28 million if 6 of the 10 generating units are in operation by the end of 1963, a full year ahead of schedule. Payment would start in September, 1963, if two units are in service by then and would add up at a rate of $1,200 a day.

Use of the slurry method enabled them to complete the cutoff trench for the cofferdam last fall in just two months, making possible a good shot at early completion. It assured completion of the cofferdam early this year, before spring floods raise the river level, and will enable them to place concrete in the spillway structure late this winter.

Wanapum Dam will be a modified Z-shaped structure with a 1,540-ft-long powerhouse paralleling the river channel on the right bank. A 797-ft gated concrete spillway, a 424-ft concrete gravity section, and an earth embankment extend at an angle of approximately 45 deg from the downstream end of the powerhouse to the west abutment.

Construction will soon be under way within the cofferdam enclosing the work area on the west bank. Later the river will be diverted through the completed spillway, and construction of the earth embankment running straight across the existing river channel from the upstream end of the powerhouse to the east abutment will proceed within another cofferdam.

Trenches Go Deep

The cutoff trenches at Wanapum reach depths of as much as 80 ft. Width of the trench for the embankment was set at 10 ft by engineers to obtain the necessary thickness needed to resist the passage of ground water, but actual

width often reaches 12 ft. The cofferdam trench averages about 7 ft in width.

A Manitowoc 4500 dragline with a 120-ft boom excavates the trenches. The crane is equipped with a 4½-yd Esco bucket especially modified for the job. Its false bottom increases the digging angle, and teeth on the heel of the bucket loosen material for easier digging.

As soon as excavation reaches ground water level — generally within 3 ft of the surface—pumps push slurry into the trench through an 8-in. steel pipe. The level of slurry is maintained above ground water level as excavation continues to bedrock.

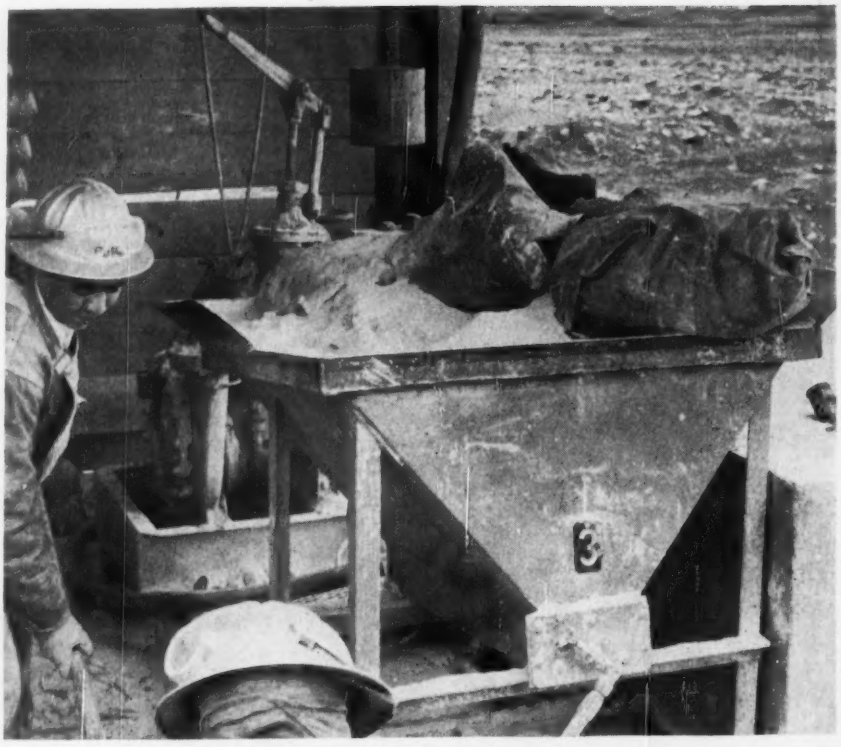
In the Trench

Here's how the slurry works. When mixed in water, bentonite becomes sheathed in a protective film of water molecules. This results in a noticeable swelling of the clay particles. The adsorption of water increases the effective diameter of the particles and also inactivates some of the water, increasing the viscosity of the mixture. The resulting specific gravity of the mixture is slightly greater than water.

In the trench the clay particles enter voids in the trench wall as the dense slurry forces water from them. The swollen particles of bentonite begin piling up in thin layers around the voids. They form a waterproof coating that prevents ground water flow into the trench or slurry water seepage out of the trench. The coating together with the density of the slurry, prevents caving of the trench walls.

When the dragline reaches bedrock, they bring in a crane with a 2½-yd clamshell to clean the bottom of the trench. An air probe then checks to see that bedrock is entirely bared; it rings like a bell on hitting exposed rock. The air probe also agitates the slurry and loosens the last remaining particles of earth from the rock, sending them up into suspension in the slurry.

Then an 80-ton P&H truck crane with a 4-yd air-operated Gar-Bro bucket places a 3-ft-thick concrete seal in the bottom of the trench to prevent erosion by ground water passing upward through crevices in the rock.



MIXING—Workmen dump 100-lb sacks of bentonite into hopper of mixer. Portable unit turns out 15 barrels of slurry per min.

At first the contractor used a closed bucket and forced concrete out under air pressure, but they soon turned to an open bucket when they found that the air pressure threw some concrete into the slurry and contaminated it.

A retardant admixture in the concrete delays the set so that a 2-ft-thick layer of impervious backfill material placed on top will bond with the concrete of the tremie seal.

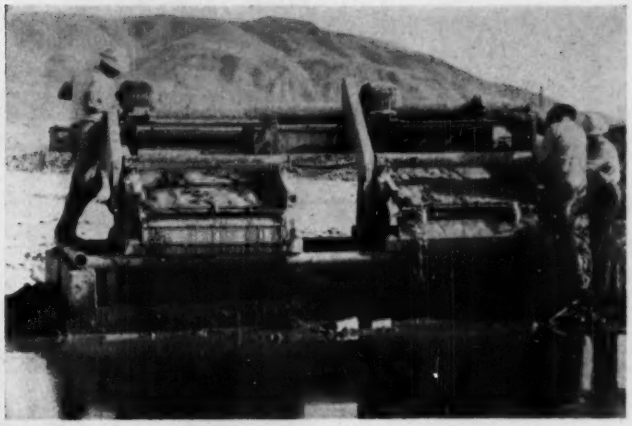
A Caterpillar D9 dozer backfills the trench. First it thoroughly mixes impervious silt with the slurry-soaked waste material cast alongside the trench by the dragline. The dozer blades a 2-ft-thick layer of the material back and forth, then pushes it into the trench. The dozer usually works about 300 to 500 ft behind the dragline.

As the backfill material drops through the slurry in the trench, the caking action that took place during excavation at the sides now occurs throughout the backfill material, binding the material into a dense, impervious mass.

The density of the backfill material approaches that of wet concrete. It does not require compaction. Tests made more than two weeks after backfilling a section of trench showed a wet density of about 150 lb per cu ft and a dry density of about 130 lb per cu ft in samples taken about 3 ft below normal ground water level.

Inspectors take frequent samples to check slurry density. Specs call for a density of not more than 80 pcf. Engineers set this limit to avoid any impedance to the movement of backfill material to the bottom of the trench. They also figured that lower slurry

PLACING—An 8-in. steel pipe carries slurry from a 10,000-barrel sump to the trench. Pumps supply fresh slurry to replace losses.



SCREENING—Pump continuously recirculates slurry through twin Link-Belt screens and into stilling basin to remove earth particles suspended in mix.

CHECKING—Inspectors in rowboats measure width of trench and take samples of slurry to check density. Specs limit density to 80 lb per cu ft.

density would reduce the tendency of the dragline bucket to float and dig less efficiently.

When it goes into the trench the density of the slurry is about 65 pcf. It increases rapidly to more than 70 pcf as fine earth particles loosened by excavation become suspended in it.

Slurry Mixing

Three portable plants, each with a capacity of 15 barrels of slurry a minute, mix the slurry. Each plant has a special jet-type mixer developed by Cronese, Inc., of Glendale, Calif., who are licensees of the patented slurry method.

Trucks haul 100-lb sacks of powdered bentonite from a railroad siding and unload them alongside an 11-cu-ft mixing hopper. Workmen open the bags by hand and empty them into one of the mixers at a rate ranging from 2½ to 7 bags a minute.

The bentonite flows in a pencil-thin stream into a mixing chamber where water from 16 small diameter jets bombards the particles. The slurry thus formed is in the ratio of one part bentonite to 12 parts water.

A Gorman-Rupp pump supplies water to the mixer from the river. A 70-hp GM diesel powers the jetting pump.

From the mixer the slurry passes into a 10,000 barrel sump. Here centrifugal pumps agitate the mixture to complete hydration of the bentonite. The slurry is then pumped through an 8-in. pipe to the trench.

The pumping rate depends on the progress of excavation and the amount of slurry lost during excavation. Fresh slurry is pumped continuously into the trench to replace loss.

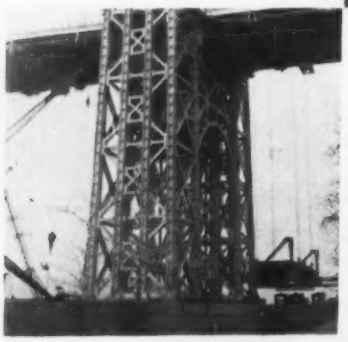
The slurry is continuously recirculated to control the amount of soil particles in suspension. A pump lifts slurry out of the trench and feeds it through twin Link-Belt 20-mesh vibrating screens to a stilling basin. After all fines settle out of the solution, the clean slurry is pumped back into the trench.

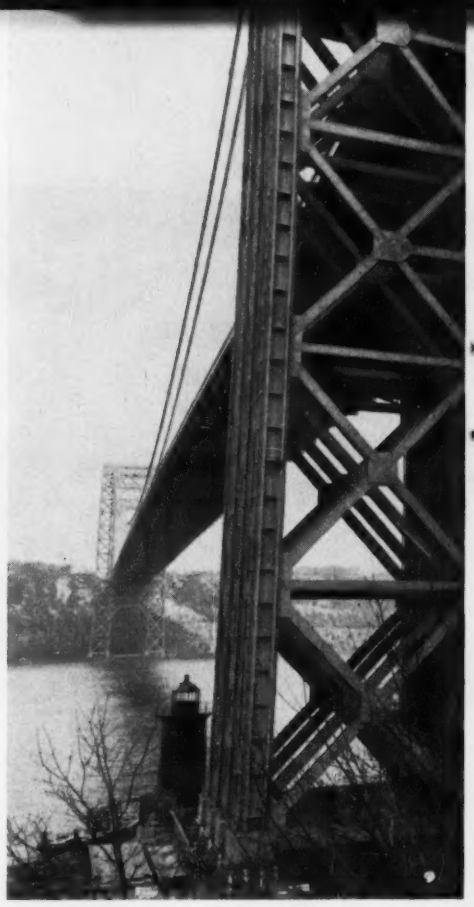
The entire project will require an estimated 500,000 barrels of slurry. Each ton of bentonite makes about 80 barrels.

Grant County Constructors is a joint venture sponsored by Morrison-Knudsen Co., Inc. Others in the combine are Henry J. Kaiser Co., Macco Corp., Raymond International, Inc., and F & S Contracting Co. George Piedmont is project manager for the contractor. H. T. Wyatt, president of Cronese, Inc., supervises the slurry trench operation.

In charge for the Grant County Public Utility District is E. B. Gibbons. R. B. Jackson is resident engineer for Harza Engineering Co., designer of the project.

To avoid interfering with traffic while they erected the lower deck of the George Washington Bridge, Bethlehem Steel Co. devised a unique trolley system to raise and place the truss.





FIRST STAGE ERECTION—Pair of trolleys mounted on rails underneath existing deck lift 220-ton truss section from ground. Truss was assembled nearby and rolled into position under the bridge. When truss reaches deck level it will be moved along under top deck to the abutment at night while road traffic underneath is detoured.

Two Trolleys on Bridge Erect

ERECTING the first truss section of the lower deck of New York City's George Washington Bridge was an unusual and tricky piece of work by Bethlehem Steel Co.

The truss is adjacent to the anchorage abutment on the New York side of the river. It was difficult to erect because it is located directly over the southbound lane of the Henry Hudson Parkway, which crosses under the bridge.

Bethlehem could not work over the roadway to erect the truss in place. So they prefabricated it in their assembly yard near the main tower of the bridge and rolled it under the bridge. Then a pair of trolleys mounted under the bridge deck lifted it up and rolled it back 600 ft to the anchorage.

The whole erection took place during the course of one day. There was no interference with bridge traffic. Parkway traffic was detoured for only a few hours during the night.

The addition of the lower deck, plus the land approaches, will cost the Port of New York Authority, who operate the bridge, about $183,000,000. Bethlehem Steel Co. has the contract to furnish and erect 13,875 tons of structural steel for the deck. The last steel is expected to be in place by early 1961.

Assembly

It took about three days to assemble the 220-ton truss section. Each member was shipped to the site individually, and the truss was assembled on the ground. The first section is 90 ft long, 108 ft wide and 30 ft deep. The remaining 75 sections of the deck are similar but not as heavy.

The first section consists of two built-up girders (transverse floor beams), two vertical posts, four 14WF diagonals, and two 60-ft box section lower chords. The floor system was completely installed. It included stringers, grid floor, barricade, sidewalk and lateral bracing. Finally, the floor system for the abutment section was lashed on top and hoisted into place at the same time.

The truss section was assembled on four rail trucks. When it was complete, a hoist pulled the whole assembly along two pairs of rails to a point directly under the bridge adjacent to the main tower.

First Stage Erection

Mounted along the underside of the existing deck from the main tower to the abutment (a distance of 650 ft) are two pairs of temporary tracks made of 24WF76 beams. These tracks will remain in place during the erection of the side span, then will be transferred to the main span for similar work.

A trolley that looks like an overhead shop crane runs along each pair of tracks. Each trolley is 106 ft long and carries a 200-hp three-drum hoist. Two of the drums feed two sets of falls each consisting of 15 part line of ¾-in

truss, then lifted it 200 ft to deck level.

Lifting time was about 30 min. But the operation actually took 1½ hr because one of the lines developed kinks, and the hoists had to be stopped periodically. Neither the kinks nor the delay were serious.

The truss was stopped about 1 ft below the connection points. There, workmen hung the truss on eight 19-ft, 1½-in. socketed pendants, and the falls were slackened off so the pendants carried the whole weight.

Then there was nothing more to be done until midnight.

Second Stage Erection

Shortly after midnight, Port Authority police closed off the southbound lane of the Henry Hudson Parkway, diverting the traffic onto the northbound lane and Riverside Drive.

continued on next page

Lower Deck

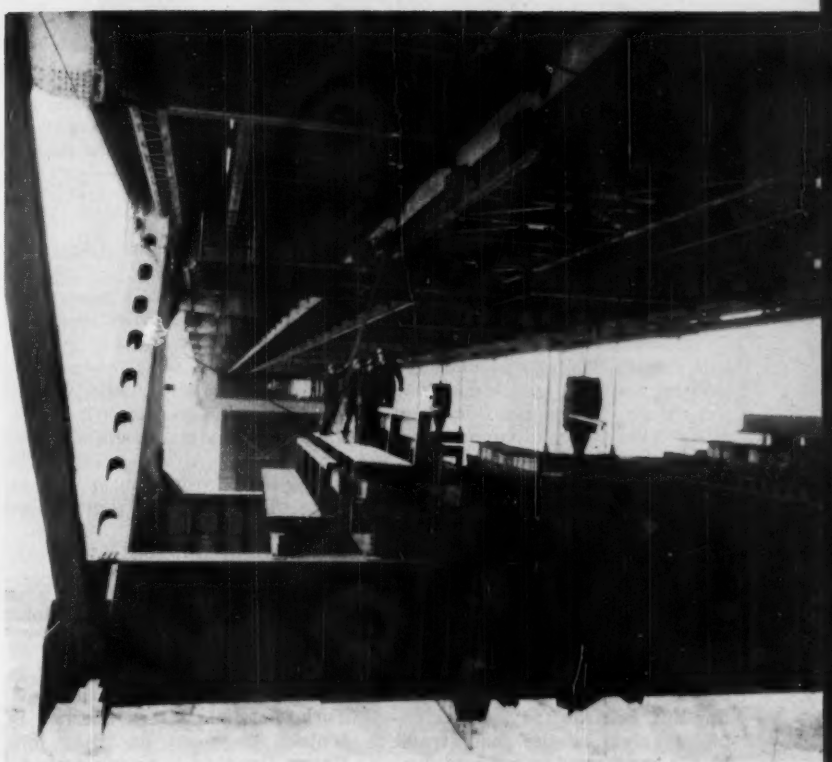
wire rope that handle the main lift.

The falls are 30 ft apart so they can pick up a truss section by its floor beams, which are 30 ft apart. The two trolleys are 54 ft apart. Each is equipped with two work platforms spaced 60 ft apart to handle the connections to the floorbeams of the upper deck.

The third drum on each hoist powers a "pull-ahead" cable that extends from the hoist to the anchorage, around a sheave, and back to the trolley. It allows the trolley to pull itself along the rails. An auxiliary hoist mounted in the tower hauls back the trolley.

Erection of the first truss section started at 11 am on January 18. Each trolley lowered its two sets of falls to pick up the truss at four points.

The downstream trolley picked up that side first because the ground was not level. Then the upper trolley lifted the other side. All four lines leveled the



SECOND STAGE ERECTION—Truss has reached deck level. Workmen now are preparing it for horizontal move. Weight has been transferred from falls to eight socketed pendants.

NIGHT OPERATION—Crews connect the first truss section to upper deck during the night. Traffic was stopped on parkway underneath from 1 am to 6 am for the job.

TROLLEYS ON BRIDGE LIFT LOWER DECK *continued*

Then the trolleys pulled themselves and the truss forward along the rails. They covered the 600 ft in about 20 min.

At the connection points, a crew took up on the falls to take the load off the pendants, raised the truss into fitting position, and made temporary connections. Later the connections will be riveted.

The temporary connections required about 5 hr to complete. By 6 am, well before the morning rush traffic, the parkway was open to traffic.

Before this truss section was erected, diagonal truss members had been connected to the anchorage. The procedure was similar but, because they were completely clear of the road, traffic had to be stopped only 5 min during the actual road crossing.

The second major truss section also is over the road and will require a full day and night schedule like the first. But from then on, the trusses will be clear of the road and work will go on during daylight hours.

On the New Jersey side, where the bridge crosses a park roadway, the situation is similar, except that the roadway is closed during the winter so there will be no traffic problem as there is on the New York side.

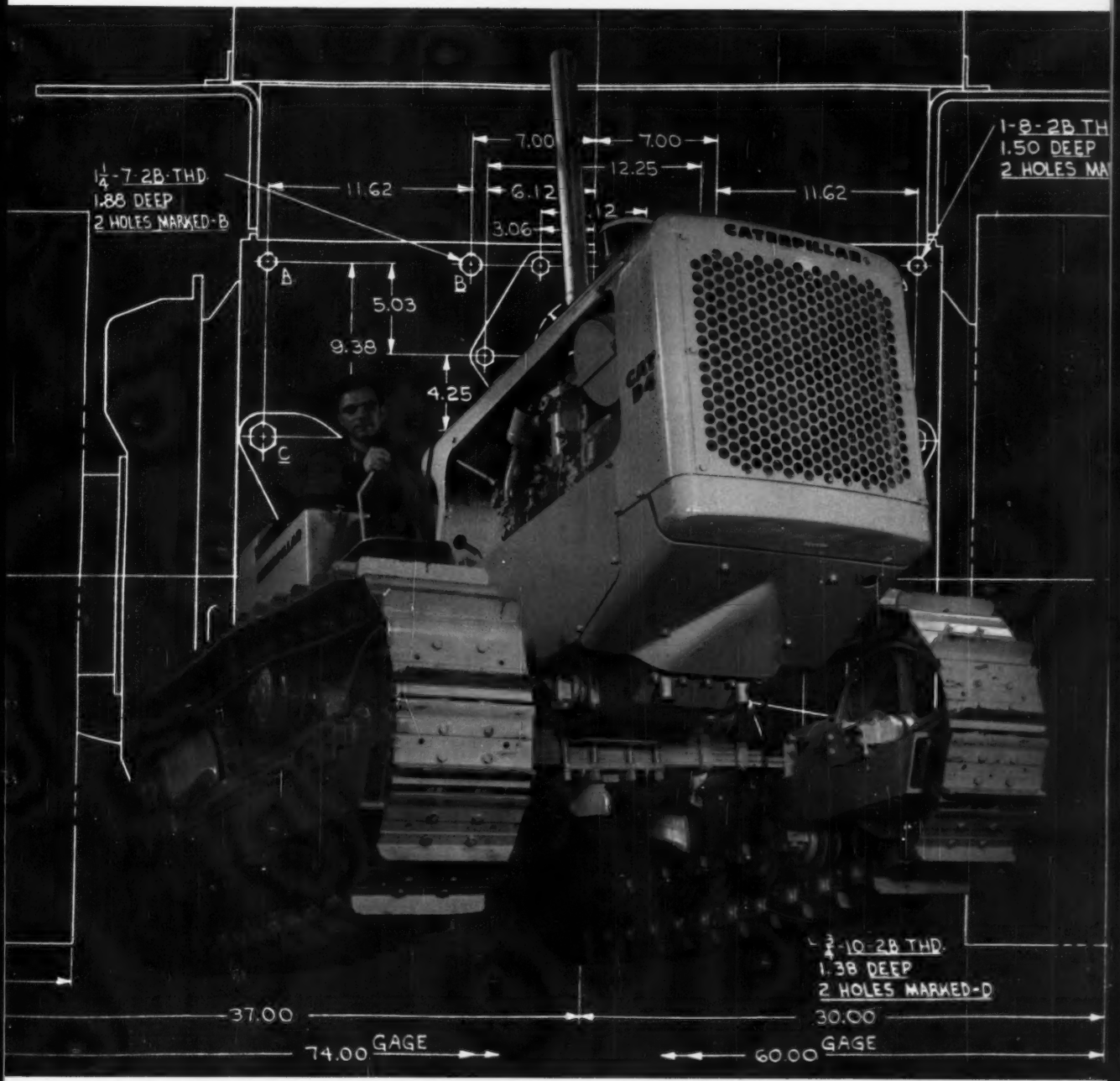
Work will proceed from both sides and will meet in the center span.

Men on the Job

For Bethlehem, G. P. Adair is manager of erection for the New York district. James Sterner is project engineer on this job. Harry Druding is resident engineer for the Port of New York Authority.

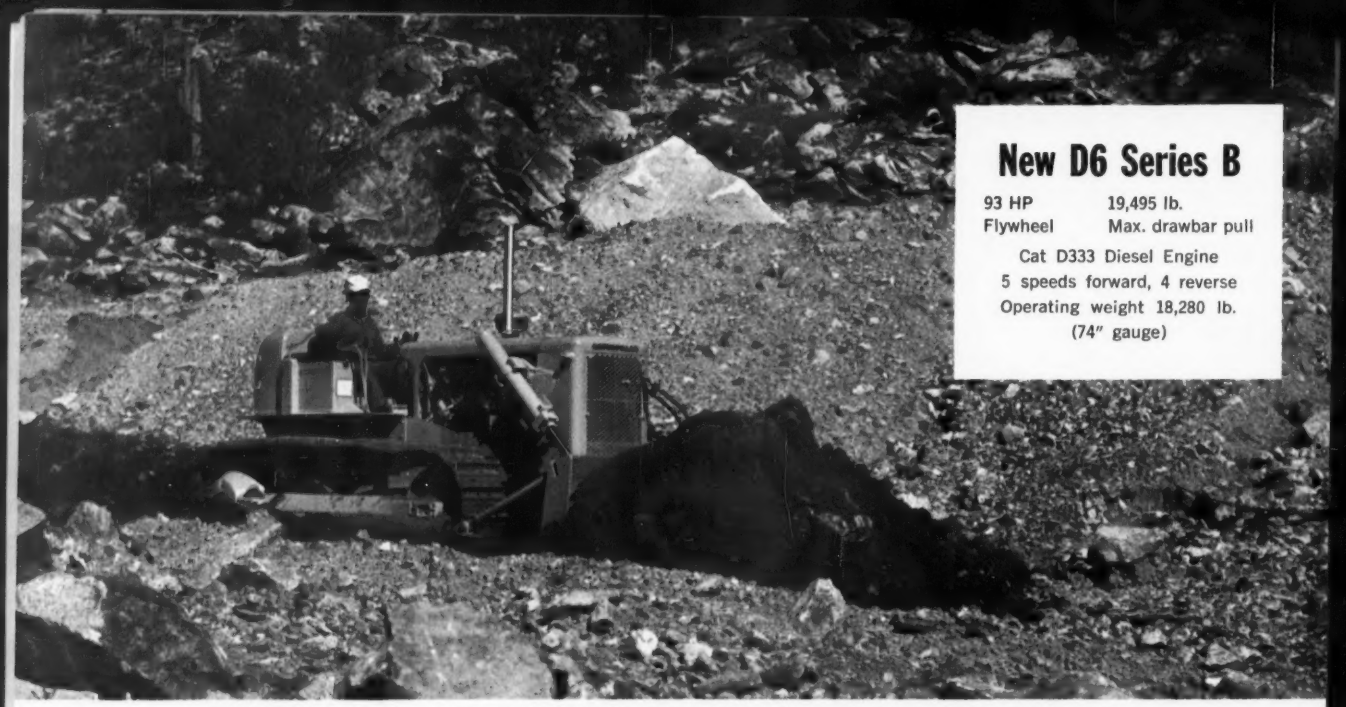
CATERPILLAR ANNOUNCES

2 NEW TRACTORS



D4 Series C · D6 Series B

completely redesigned to boost production and lower costs

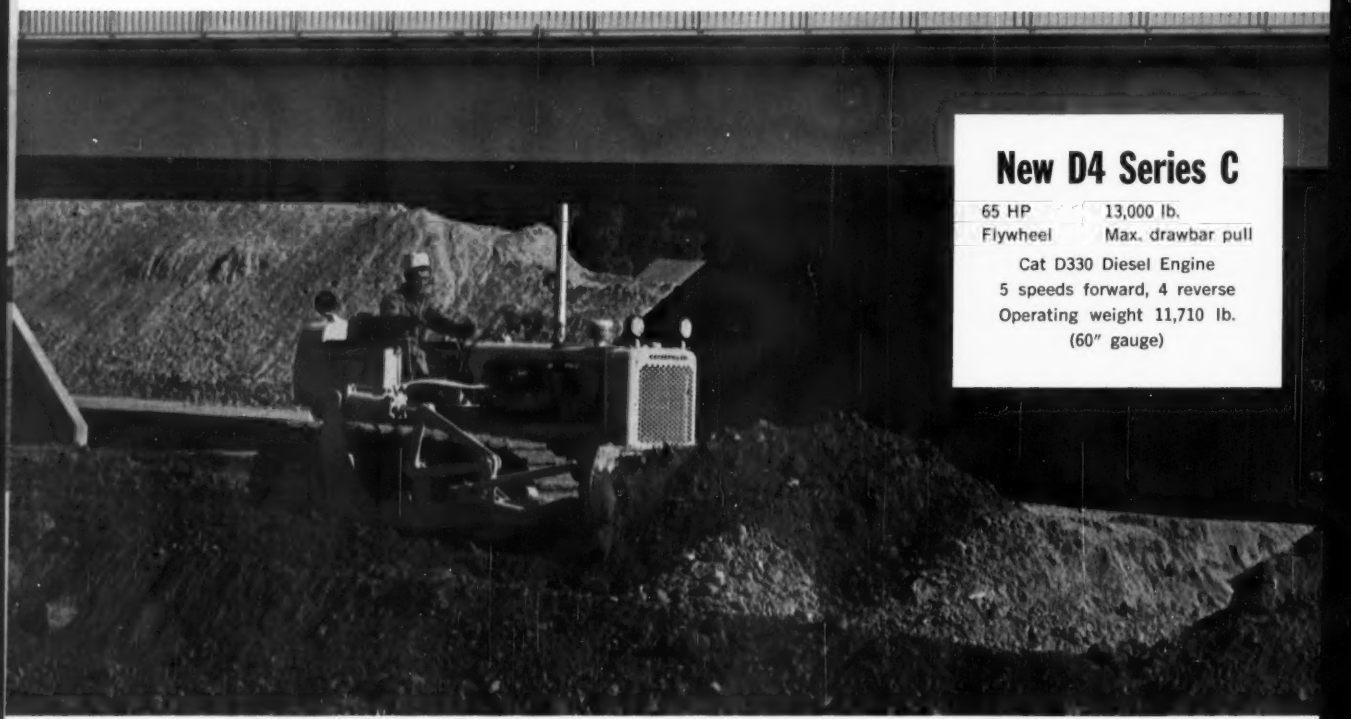


New D6 Series B

93 HP Flywheel — 19,495 lb. Max. drawbar pull

Cat D333 Diesel Engine
5 speeds forward, 4 reverse
Operating weight 18,280 lb.
(74″ gauge)

ATTACHMENTS for the D6 and D4, individually designed to match the capacities of each machine, include Bulldozers, Tool Bar, Rock Rakes, Winches, K/G Blade, Back Rippers and many others.



New D4 Series C

65 HP Flywheel — 13,000 lb. Max. drawbar pull

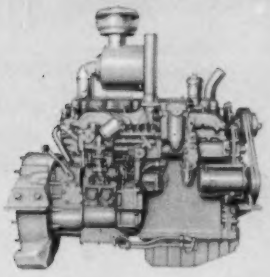
Cat D330 Diesel Engine
5 speeds forward, 4 reverse
Operating weight 11,710 lb.
(60″ gauge)

STARTING EQUIPMENT for both tractors includes an improved starting engine with recoil starter for fast starts. 12-volt in-seat starting for starting engine available. 24-volt direct electric starting for diesel optional.

NEW D6 Series B and D4 Series C Tractors...

They look different—they are different. Look them over and see for yourself the advances Caterpillar has built into the new work-styled D6 Series B and new D4 Series C Tractors. Each, in its own class, answers your need for new high production, new operating

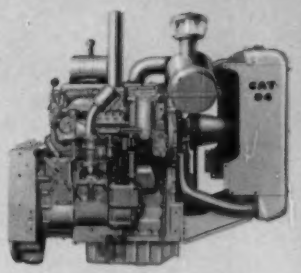
New compact Caterpillar Diesel Engines deliver 25% more lugging ability



D6 powered by 93 HP 6-cylinder Engine

Maximum drawbar pull, 19,495 lb. Provides power with dependability built in for a long life of economical, efficient operation.

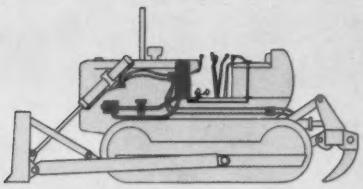
Here's power for even bigger jobs for the D6 and the D4—two completely new Cat Diesel Engines. Each is specifically designed for the tractor it serves. Yet each has certain basic characteristics in common. For example: 25% more lugging ability . . . new compactness, with new ruggedness . . . famous Cat fuel injection pumps in new, easily serviceable housings . . . the reliable Cat precombustion chamber design that delivers maximum horsepower on heavy, economy-type fuels . . . a new direct-acting governor that makes quick fuel adjustments, picks up loads fast . . . a new improved gasoline starting engine with recoil starter for fast starts in any weather—many others!



D4 powered by 65 HP 4-cylinder Engine

Maximum drawbar pull, 13,000 lb. New design results in a smooth, vibration-free performance through all speed ranges.

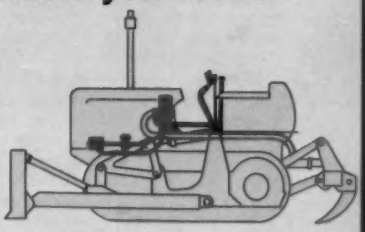
New integral hydraulic systems put more power where you need it



D6 Integral Hydraulic System

No. 165 Hydraulic Control for Bulldozer, 54 GPM—1500 PSI
No. 143 Hydraulic Control for No. 6 Tool Bar, 29 GPM—1700 PSI

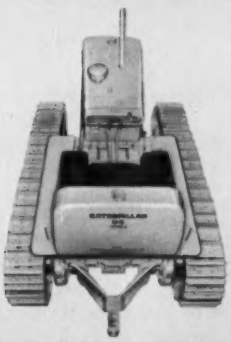
More work power at the tools—you'll find that's one of the big advantages of these new Cat hydraulic systems. Under-the-hood mounting of tank, pump and valves permits convenient routing of hydraulic lines to bulldozer or implement cylinders, frees front and rear end for optional equipment. Center-pivoted cylinder mounting on the D6 gives increased blade lift/drop range for increased production. Hydraulic control system provides hand control for bulldozer and/or ripper, foot control for tilt cylinder. A choice of three hydraulic circuits gives you complete flexibility to meet all needs. You also have a wide choice of tools to make both tractors even bigger earners.



D4 Integral Hydraulic System

No. 143 Hydraulic Control with:
29 GPM Pump—1700 PSI for Bulldozers
17 GPM Pump—1700 PSI for Tool Bars

New operator convenience and comfort in co-ordinated compartments



D6 operator's compartment

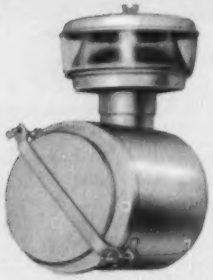
Look what's happened to the operator's compartments in the D6 and D4! Both are all new and completely restyled. The controls are co-ordinated to make one motion flow into the next one. They reduce hand movements and speed every operation. The forward-reverse lever is located next to the operator's right hand to quicken 'dozer cycle times. The transmission speed selector is only inches away. The governor control is high and clear, extending from the new streamlined, quick-vision dash. Boosters for steering clutches provide muscle-saving operation. And the comfortable, high-placed seat allows full view of tools for faster, more accurate work.

D4 operator's compartment

better than ever with new work-producing features!

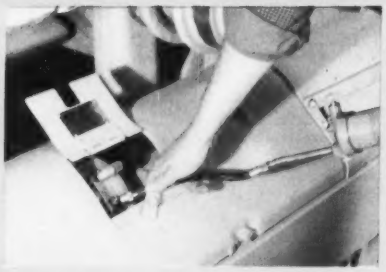
economy and new earning capacity. Each is completely redesigned to lick the tough challenge of today's fast-paced jobs. Some of their new features are described here. Notice how they complement performance-tested features to make these modern, heavy-duty rigs better than ever. See your Caterpillar Dealer for complete facts about them and their matching equipment. He'll gladly demonstrate on your job.

More features that put the new D6 and new D4 out front in production and economy!



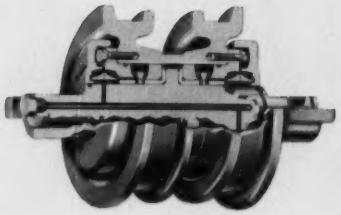
Dry-type air cleaner

Most efficient air cleaner ever developed. Removes 99.8% of all dirt from intake air during every service hour, even in the dustiest conditions. Can be serviced in five minutes. Cuts maintenance time (by as much as 75%) and eliminates all oil costs. This modern-design oil cleaner is new in both the D6 and D4.



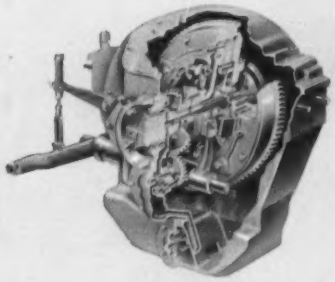
Hydraulic track adjusters

Another on-the-job timesaver developed by Caterpillar. An ordinary grease gun is all that's needed to assure proper track tension. Just open the inspection door and apply a few strokes. The hydraulic cylinder does the rest automatically. Job-tested, hydraulic track adjusters are optional on both the D6 and D4.



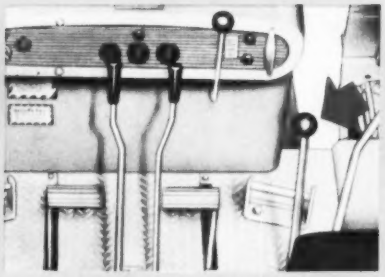
Lifetime lubricated track rollers

That's right – lifetime! Proved by more than five years' testing. Exclusive floating ring seals protect rollers and idlers – keep oil in, dirt out. No lubrication or greasing at all required until rebuilding. Help you roll up profits instead of repair bills. This long-life feature is new in both the D6 and D4.



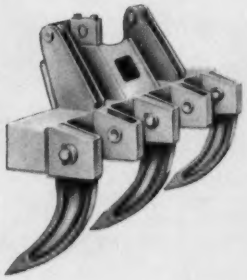
Oil clutch

The most advanced clutch design in the industry – a Caterpillar exclusive. Provides up to 2,000 hours' service without adjustment, the equivalent of about 13 months' "adjustment-free" operation. Virtually eliminates down time for clutch repair. Retained on the D6. Optional on the D4.



Forward-reverse lever

Retained on the D6, this lever is new on the D4 – **an exclusive feature in its class** – and puts the D4 way ahead of the rest in fast 'dozing cycles. Next to the operator's right hand, and only inches away from the transmission speed selector, it lets you change direction quickly and easily.



Matched equipment

You can multiply the profitable uses of both the D6 and D4 with rugged matched equipment. Built to specifications for each tractor, there are Straight and Angling Bulldozers, Rippers, Tool Bars, Rock Rakes, Winches, Bulldozer-mounted Back Rippers, K/G Blades and other tools. Hydraulic or Cable Controls.

ARE YOU GETTING ALL THE PROFIT?

Now is the time to take careful stock of your equipment—to make sure it's earning you all the profit to which you are entitled. All too often, profits slip away because a tractor that appears to be paying its way is actually not delivering the way it should.

A veteran tractor, for example, may be holding down a key job. Repair costs are low. On the face of it, the tractor seems to return a decent profit. But in reality—that tractor could be losing as much as it earns.

Machines have improved a lot in recent years—and Caterpillar has set the pace all along the line. Consider the new D6 Series B and new D4 Series C Tractors. In terms of work, both of these rugged units can do a lot more—not only mechanically—but from the standpoint of greatly increased operator efficiency. A comparison of your existing equipment with these work-styled machines might easily prove a new tractor would increase your output and profits far more than you imagine.

Ask your Caterpillar Dealer to demonstrate the giant strides represented by these two new tractors. Investigate the complete line of attachments that double and triple their usefulness to you. See for yourself how the new D6 and new D4 can help you earn *all* the profit you should on your jobs!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

BORN OF RESEARCH
PROVED IN THE FIELD

5 reasons why Atlas Copco's "TIGER" is best for stoping and all short-hole drilling!

(1) It's fast and easy to handle!

(2) It's easy collaring, with little recoil!

(3) Features a retractable air leg!

(4) Convenient controls, automatic back head!

(5) Operates on single air supply!

Here's the TIGER—a new, fast, compact rock drill with power and stamina to meet toughest drilling requirements! Its high percussion rate not only speeds penetration, but at the same time cuts recoil to a minimum. With controls conveniently located, collaring is unusually easy.

What's more, the automatic back head prevents dry collaring. Flushing water actually flows before drilling starts. And, the Tiger's "constant blowing" provision sends air through the machine the instant pressure is turned on, keeping water and cuttings from the rotation chuck.

There's still another "plus"—the Tiger's exclusive integral type pusher leg, with retractable piston rod. Operates on a single air supply!

This isn't the whole story by any means. For more facts about the amazing new Tiger rock drill and how it can speed *your* drilling, call your nearest Atlas Copco representative. Or, write to us at Dept. CM-10.

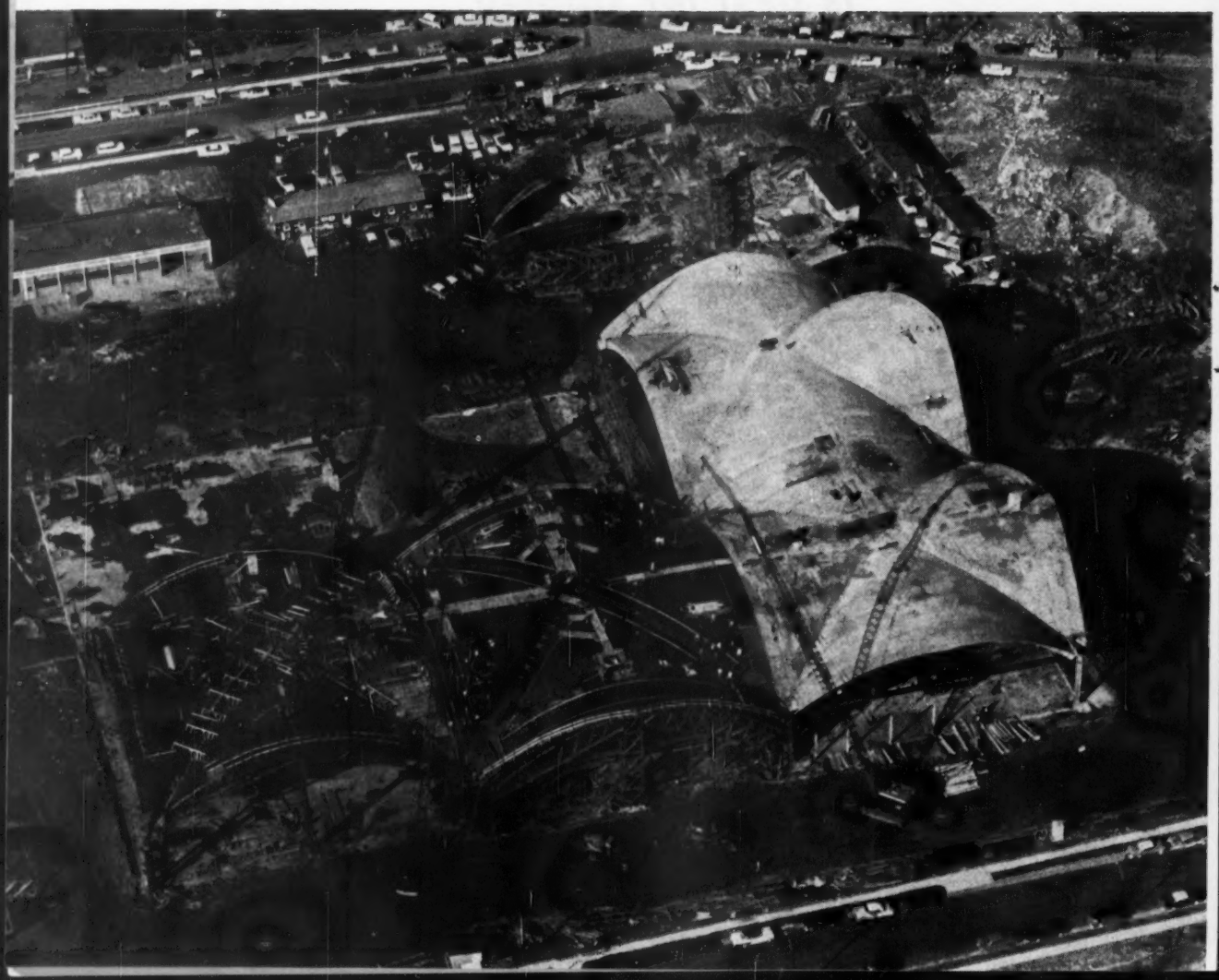
Atlas Copco

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

930 Brittan Avenue
San Carlos, California
LYtell 1-0375

Six pairs of 150x140-ft intersecting barrel arches form the roof of a post office building that encloses 126,000 sq ft and has only two interior columns. Formwork for the roof was shop fabricated to precise dimensions and assembled at the site. Each of the 16-ton form sections is moved in one piece from pour to pour.

Formwork for Curved Roof Is Massive but Movable



SIX-PART ROOF—Each pair of intersecting arches forms a structurally independent roof section resting on four steel columns.

FIELD ASSEMBLY—Shop fabricated wood trusses are assembled at the job site. Each of the two sets will be used three times.

ARCHED WOOD TRUSSES, shop fabricated to precise dimensions, hold forms for the curved concrete roof of a sprawling building in Providence, R.I. Six pairs of intersecting barrel arches with many complicated curves make up the roof.

Without the shop fabricated forms, it might have been necessary to make as many as 17,000 individual elevation adjustments. The contractor, Gilbane Building Co. of Providence, figured that forms held by scaffolds would require an adjusting screw every 4 to 5 ft.

The building is 300x420 ft and will house the first completely automated post office in the world. To make room for the production line mail-handling machinery, the designers planned a structure with large working spaces unobstructed by columns. There are only two interior columns in the building.

Each pair of the intersecting barrel arches forms a structurally independent roof section that rests on steel columns. The roof is 26 ft high at the supports and 58 ft high at the center of the arches. Each section is 140x150

Edge beams along the four sides of a section give the roof additional strength. Beams running diagonally across each roof section strengthen the shell along the valleys formed by the intersecting arches.

The outside edges of the roof are cantilevered to extend beyond the edge beams. These cantilevers—or eyebrows—are 15 ft wide at the top of the arch and taper down to the column.

Post-tensioned steel tie beams in line with the edge beams prevent the thrust of the arch roof from moving the columns horizontally.

Foundations

Underlying the entire structure are 1,016 Cobi 60-ton piles varying in length from 55 to 70 ft. The two permanent center columns alone rest on 113 piles. C. L. Guild Construction Co., Inc., of East Providence, R.I., installed the cast-in-place piles in 36 working days. Gilbane's own crews handled all excavation.

Above the foundations are 24 box-section steel columns fabricated from 2-in. plate. A single column supports each of the four outside corners of the building. Double columns carry the load at six places where corners of two adjoining roof sections meet. The two center supports are each made up of four columns to carry the corners of the four adjoining roof sections.

Anchor bolts, 2 in. in dia and 8 ft long, are imbedded in the foundations to hold the column base plates in place. Plates for the 40-ton, four-column center supports are 4 in. thick and require 36 bolts each.

An 8-ton steel head on top of each column transmits the load from the two edge beams and the valley beam to the column. Tie beams also are attached to the column heads. The A. O. Wilson Structural Co. of Cambridge, Mass, fabricated the tie beams, columns, and column heads.

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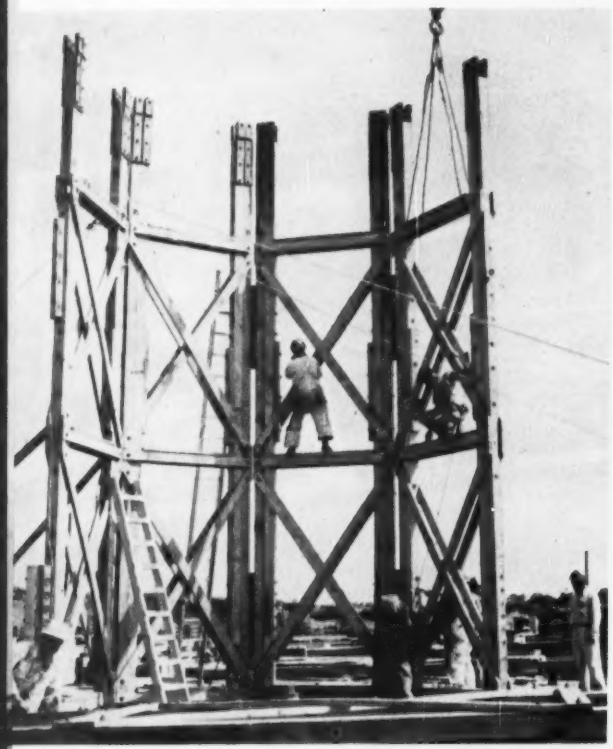


IN THE CENTER—Crew erects 56-ft high tower at the center of a roof section to carry one corner of eight triangular forms.

AT THE EDGE—Crane positions a form. Each corner along the edge of a roof section is bolted to the side of a support column.

Bolted Connections Speed Erection

Complex Formwork

The roof called for some unusual construction techniques and specially designed forms. After considering several form support systems, Gilbane chose wood trusses.

The wood trusses could be fabricated in a shop, and only a small labor force would be needed once the forms were assembled. This made it possible to handle construction of the formwork as a subcontract at a firm price.

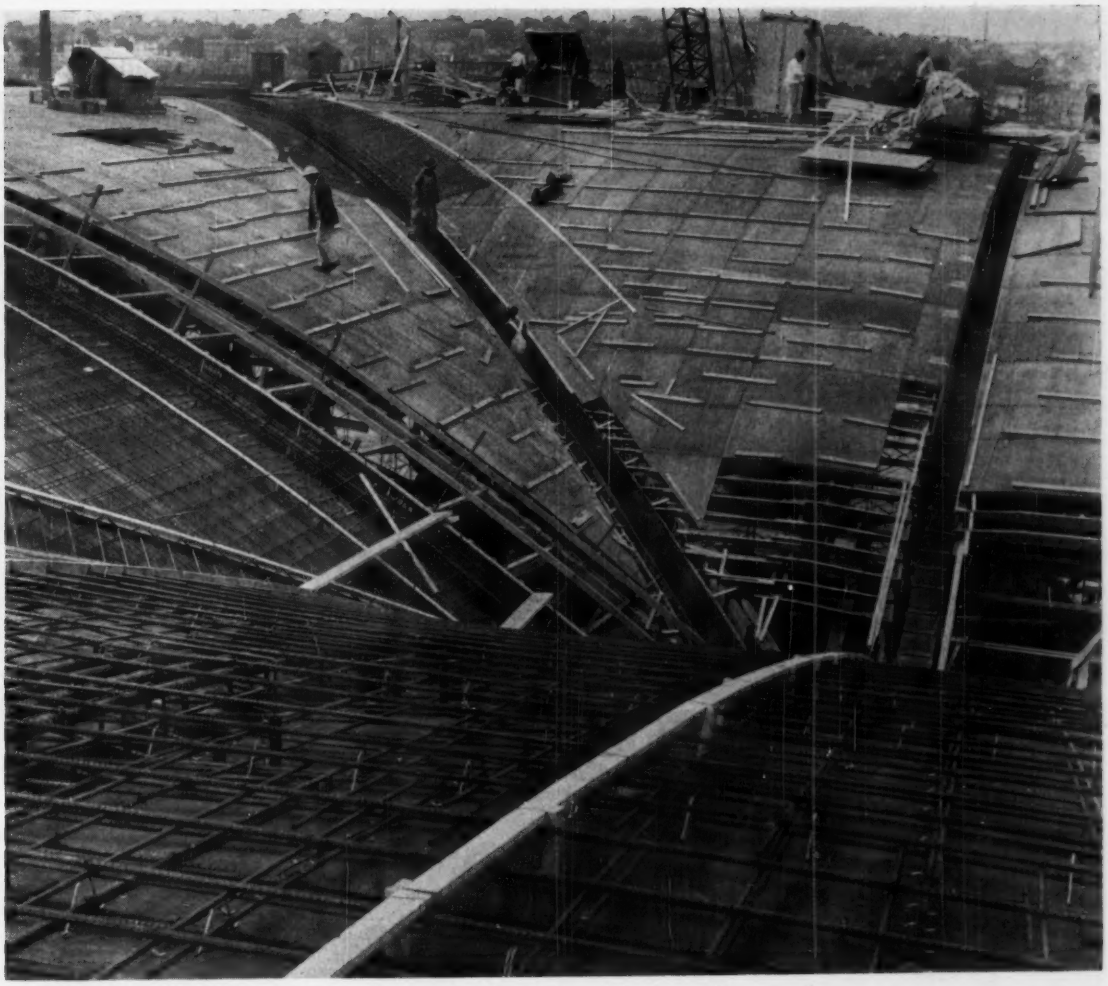
Cartwright & Morrison, Inc., of Holcomb, N.Y., got the contract to design and fabricate the wood trusses for the formwork. They built two sets of forms, each to be used three times. Controlling design factor was the method for decentering and moving the structure from one roof section to the next.

Because the steel tie beam is 30 ft below the crown but only 26 ft above the ground, a 140 or 150-ft clear span structure was out of the question. It would have been impossible to get such a structure out from under the roof and under the tie beam without extensive disassembly.

Engineers at Cartwright & Morrison designed structures that do not exceed 26 ft in height when decentered. They divided each roof section into eight parts, each a triangle with one corner at the center of a roof section.

One leg of the triangle is the valley truss; it is positioned along the side of a valley beam. A ridge truss, running along the crown of the arch, forms the second leg of the triangle. A purlin truss at right angles to the ridge truss is the third leg; it is parallel to the edge beam. Three additional purlin trusses, also at right angles to the ridge truss, are spaced at 16-ft centers and supported at the other end by the valley truss. Over this structure are 2x10 rafters placed on 16-in. centers and covered with 5/8-in. plywood.

The eight triangular forms rest on wood support columns. At the center of a roof section, an octagonal tower about 16 ft in dia and 56 ft high supports the in-



ON TOP—Crews cover the trusses with plywood and begin placing reinforcing steel. The roof will require about 800 tons of steel, and most of it will be tied in place.

terior corner of each form. A separate column bent supports each of the other two corners.

Three center support towers are used with the two sets of forms. Because the tower is the last of the support structures to be moved, the extra tower can be erected before stripping to speed up the forming.

To support the cantilever eyebrows along the exterior wall, they built four trusses with a span of about 65 ft. A square column at the center and column bents at the ends support these trusses.

Cartwright & Morrison prefabricated all wood structures in their shops, shipped them to the job site, and field-assembled the trusses. Gilbane's men took care of the erection.

A total of 300,000 ft of Douglas Fir went into the wood structures. In addition, 34,000 TECO connectors, 28,000 machine bolts, and 40 tons of miscellaneous structural steel went into the fabrication. The roof dimensions complicated the fabrication because there were no standard angles to work with. The diagonal makes angles of 43 and 47 deg with the legs of the triangles. Cartwright & Morrison feel that this is the most difficult job they have tackled in 20 years of business.

Just to play safe and to avoid any forming difficulties, Stewart Morse, superintendent for Cartwright & Morrison and Richard Martin project superintendent for Gilbane and their key men spent many hours trying to anticipate trouble and planning all moves.

One unexpected problem did arise: tests at the Massachusetts Institute of Technology on a plastic model of the structure brought about several design changes that increased the weight of the concrete roof. And it was necessary to beef up the supporting structures to take the extra load.

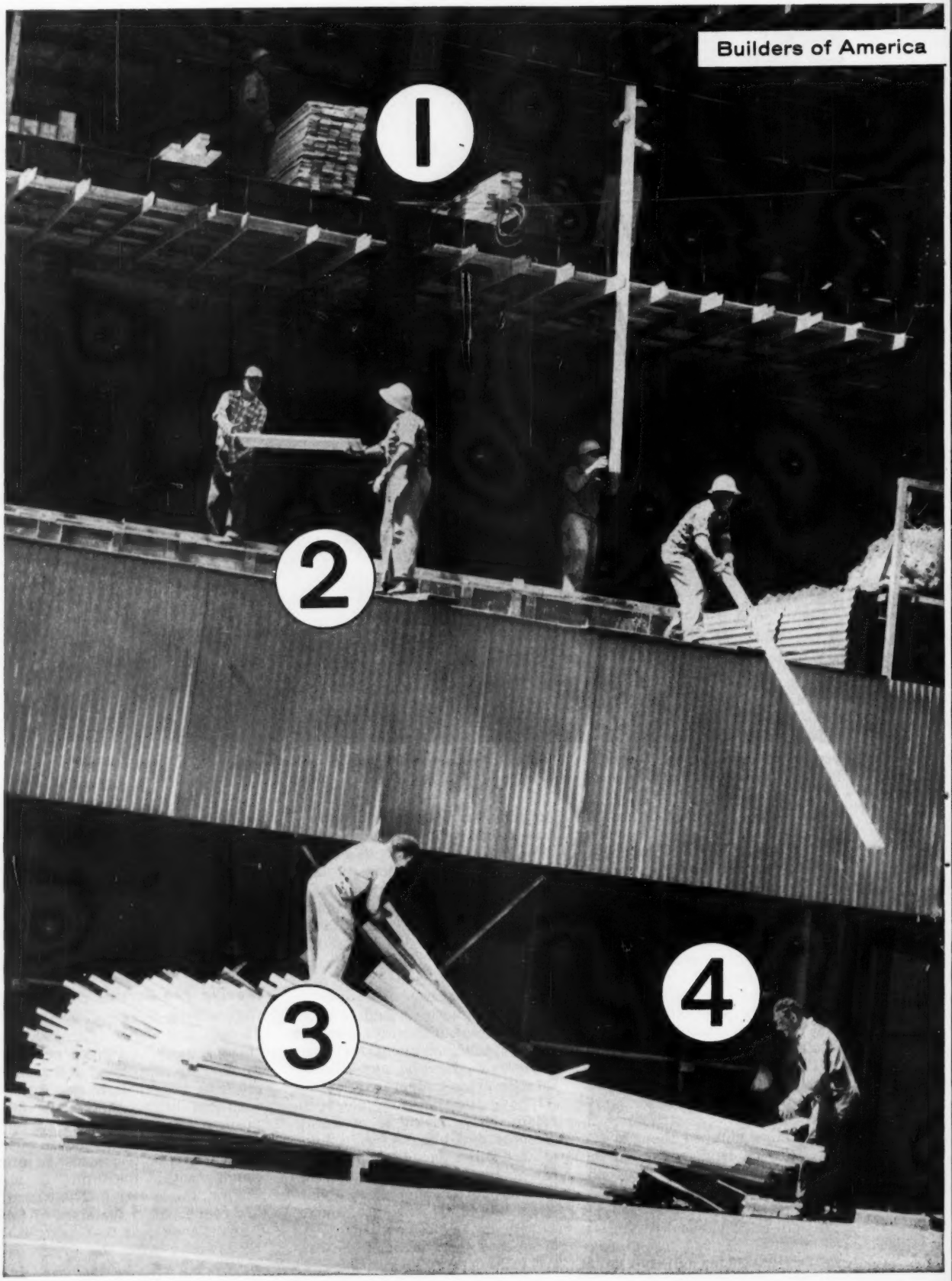
On the center towers, the original 16 legs of 6x6's had to be doubled by adding 16 more 6x6's and securing them with TECO split ring connectors. Plans for the valley truss had to be modified extensively.

Moving The Forms

Each form section weighs about 16 tons. The difficulty in moving them is not the weight but the method of supporting the forms while in motion. Lowering, moving, and lifting the forms into position follows a well-rehearsed procedure. In fact, Gilbane's men made several test runs before moving any of the forms.

First, the lowering. The trusses are connected to the sides of the support towers so that forms can be lowered with the towers in

continued on page 106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know: **A**merican **M**utual aims at Better Protection . . . Lower Cost

Just handing up lumber— but accidents could bring profits down, if . . .

1. Third-floor pile overloads form supports
2. Man overhead slips and falls
3. Pile rolls and drops man standing on it
4. Men get hit by falling lumber

You have probably found that routine jobs, like putting up forms, can become the most dangerous ones. Your men do it so often that the performance becomes automatic, and hazards that lead to accidents are overlooked, resulting in lost time—lost profits.

What you should do is this: call in the American Mutual Safety Engineer *before* work begins. Like your carpenters or welders, he is a specialist in *his* job—preventing accidents.

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FORMWORK FOR CURVED ROOF . . .

continued from page 103

Hand Winches Lower Forms, Trucks and Cranes Move Them

LOWERING A FORM—Winches attached to the columns near the base (top) lower the forms. A hoist line from the winch passes over a sheave at the top of the column and carries the weight of the form when the bolts are removed (right).

place. Steel plates are mounted on the ends of the trusses and on the towers and all connections are bolted. To carry the weight of the form after bolts are removed, a hoist line is attached to the end of each truss. The line passes over a sheave at the top of the tower and is controlled by a 10,000-lb capacity Sasgen hand winch installed near the ground.

Where cranes can reach the corner of a form, a winch is not necessary. When the roof is poured, openings are left in the concrete directly above the corners of the forms. To lower the form, the hoist line is passed through one of these openings and secured to the truss. Lowering forms with a crane is simpler because it is easier to control than a hand winch, and it eliminates the time needed to install a winch on a support column.

The form is lowered onto trucks that move it out from under the roof. At the start of construction, Gilbane tried to move the forms on skids or on rollers, but this didn't work out satisfactorily.

So they resorted to trucks. One truck, a Diamond T with a flat-bed trailer, carries one corner of the form. Another truck, a Mack with a pole dolly, carries the other two corners. The trucks do nothing more than to move the form far enough to clear the roof. They cannot maneuver well enough to haul the wood structure to its new location.

Once the form is out in the open, three crawler cranes pick it up from the trucks and walk it into position. This is not always a simple operation because of the difficulty in maneuvering. To turn corners, the cranes must put the form down, turn to face the new direction, then pick up the form and continue to move. A 90-deg turn sometimes requires several stops.

Models Help Plan Moves

To move the bulky form sections in the easiest and most efficient way, Richard Martin and his men worked out all moves with models.

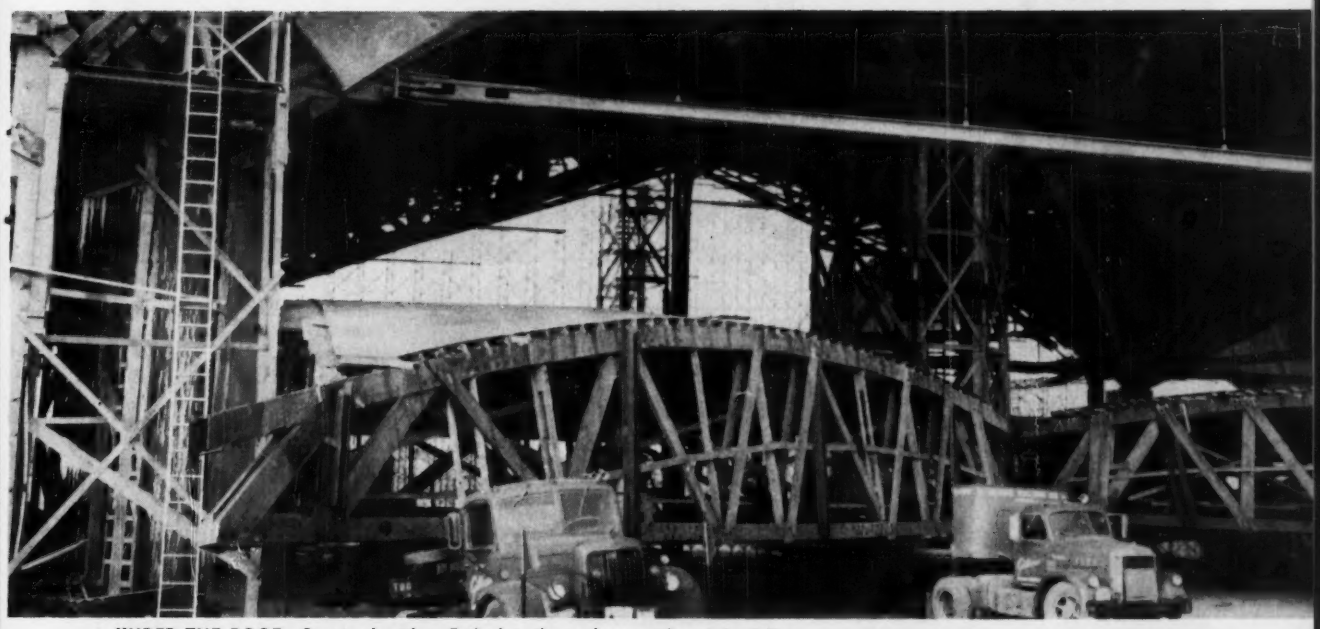
In addition to working out the best route for each move, they had to make sure that a form section would be oriented properly when it arrived at the new location.

Planning with models was helpful elsewhere, too. Because a portion of the floor covers a basement, it is necessary to reinforce the floor before cranes can move on it safely. Here again all moves were carefully planned with models to avoid reinforcing the entire floor. They were able to handle all moving operations with only one path across the entire basement and several short paths near the basement walls.

Positioning the Forms

Raising the forms is just the reverse of lowering them. Cranes work where possible, and winches handle the center column and corners inaccessible to cranes. Positioning the forms is a short operation because all three connections—one at each corner—are bolted. It takes about one day to lower, move, and erect one triangular form section.

After the eight forms are stripped and moved, Gilbane moves the 20-ton center tower in one piece. First they jack it up to remove the tower base, then they pull the bottom of the tower, tipping it over on its side. Once it is on the ground, the 56-ft tower is



UNDER THE ROOF—One truck with a flatbed trailer and one with a pole dolly carry the form after lowering. The two trucks move only far enough to clear the building because they cannot maneuver well enough to haul the form to its next location.

much easier to handle than the forms.

Reinforcing Steel

A total of 800 tons of reinforcing steel will go into the roof. All of the steel in the shell and in the stiffened portions around the beams is tied in place. But the bars going into the various beams are tied together on the ground.

Some of the steel work, especially around the valley beams, is rather complicated. The shell contains ¾-in. bars in two directions, and the diagonal valley beams contain 1⅛ in. longitudinal reinforcing. In addition to the tie-bars around the beam steel, the stiffened shell portion near the beam contains ⅞-in. bars at right angles to the beam and two bars on each side of the beam parallel to it.

At each end of the beam, additional reinforcing bars make the shear connection between the beam and the column head. These 4-ft long shear connectors and all of the longitudinal bars are cut with a saw to insure a smooth surface and are welded to the head plate.

continued on next page

IN THE OPEN—After the form clears the building, three cranes pick it up and walk it into position. It takes one day to move a form section from one pour to the next.

FORMWORK FOR CURVED ROOF

continued

Concreting

Lightweight concrete, weighing 110 lb per cu ft, goes down in two pours for each roof section. The first pour averages about 550 cu yd and covers all of the beams and the stiffened portions adjacent to the beams. The second pour, about 250 cu yd, completes all of the remaining 6-in. thick shell.

Each pour must be completed in one working day to insure a high quality concrete structure. To do this in the short daylight hours of the Rhode Island winter takes good coordination and close cooperation among the crews on the roof, the operators of the four cranes, the concrete supplier's plant and truck drivers, and Gilbane's field office. Thus far they have completed four roof sections successfully.

CONCRETING — Concrete is placed in two pours for each roof section. First pour covers all beams and the adjacent areas. Second pour completes the 6-in.-thick shell.

The second important consideration in pouring the roof is that of positioning each load of concrete. The entire supporting structure is designed to carry a symmetrical load. And the concrete pouring must proceed in such a manner as to avoid any eccentric forces on the truss system.

Each crane works at one corner of the roof section. The corners are numbered from 1 to 4, and trucks are dispatched to these stations in rotation.

The four crawler cranes pouring the roof are a 50-ton Northwest, a 40-ton Lorain, and two 50-ton Manitowoc cranes. One of the Manitowoc cranes is the only crane with a boom long enough to reach to the center of a roof section. To pour beyond the reach of the other three cranes, Gilbane puts stationary hoppers on the roof to feed concrete buggies.

Tie Beam Tensioning

During formwork and concreting, other crews prepare to erect the tie beam along each side of the roof section. A working platform built of Patent scaffolding supports the tie beam while it is being secured to the column heads about 26 ft off the ground.

continued on page 112

FROM 4 TO 22 TONS

Whatever the rig . . .
ONE MAN just drives on to load . . .

with a **MILLER** *Tilt-Top*

"OTS-22"
8' x 4' stationary platform with 8' x 16', or 20' long tilt section available. Gooseneck tongue. Tandem dual wheels suspended directly from tongue frame on new spring beams. 22 ton capacity.

"OTG-15"
Over-the-wheels 8' x 16' 6", or 20 ft. platform available. Gooseneck tongue. Dual wheels mounted on tandem axles with oscillating walking beam suspended directly from tongue frame. 15 ton capacity.

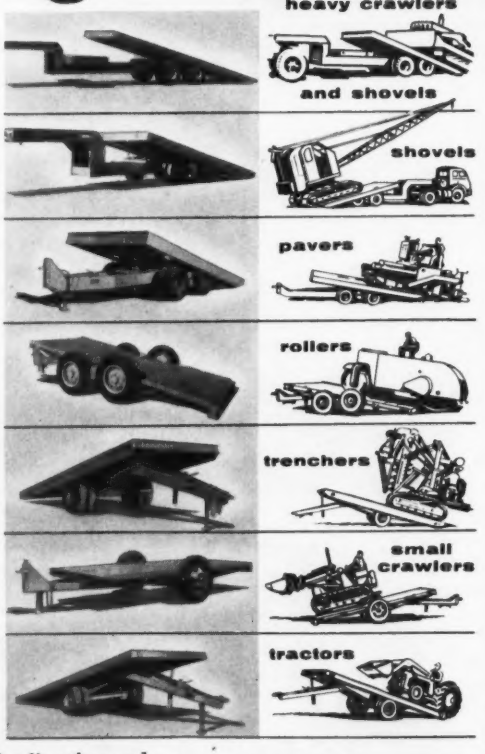
"OT-15"
Over-the wheels, 8' x 16' 6", or 20' platforms available. Eight wheels, dual assemblies, mounted on tandem axles with oscillating walking beam. 15 ton capacity.

"BT-10" & "CT-7"
Extra low, load angle, between-the-wheels platform. 76" wide—either 14' or 16' long. Four single wheels mounted on tandem axles with oscillating walking beam. 10 ton capacity on "BT" . . 7 ton on "CT".

"J-6", "8" & "10"
Heavy duty over-the-wheels models. 8' x 14' platform—16' and 18' platforms available. Single axle, dual wheels. Capacity: "J-6", 6 tons; "J-8", 8 tons; "J-10", 10 tons.

"C-4"
Extra low loading angle, between-the-wheels platform 8' x 14', 16' platform available. Two single wheels mounted on straight-thru H beam axle. 4 ton capacity.

"H-4"
Over-the-wheels, 8' x 14', or 16' platform available. Single straight-thru axle, dual wheels. Completely equipped with heavy duty, first line trailer tires. 4 ton capacity.



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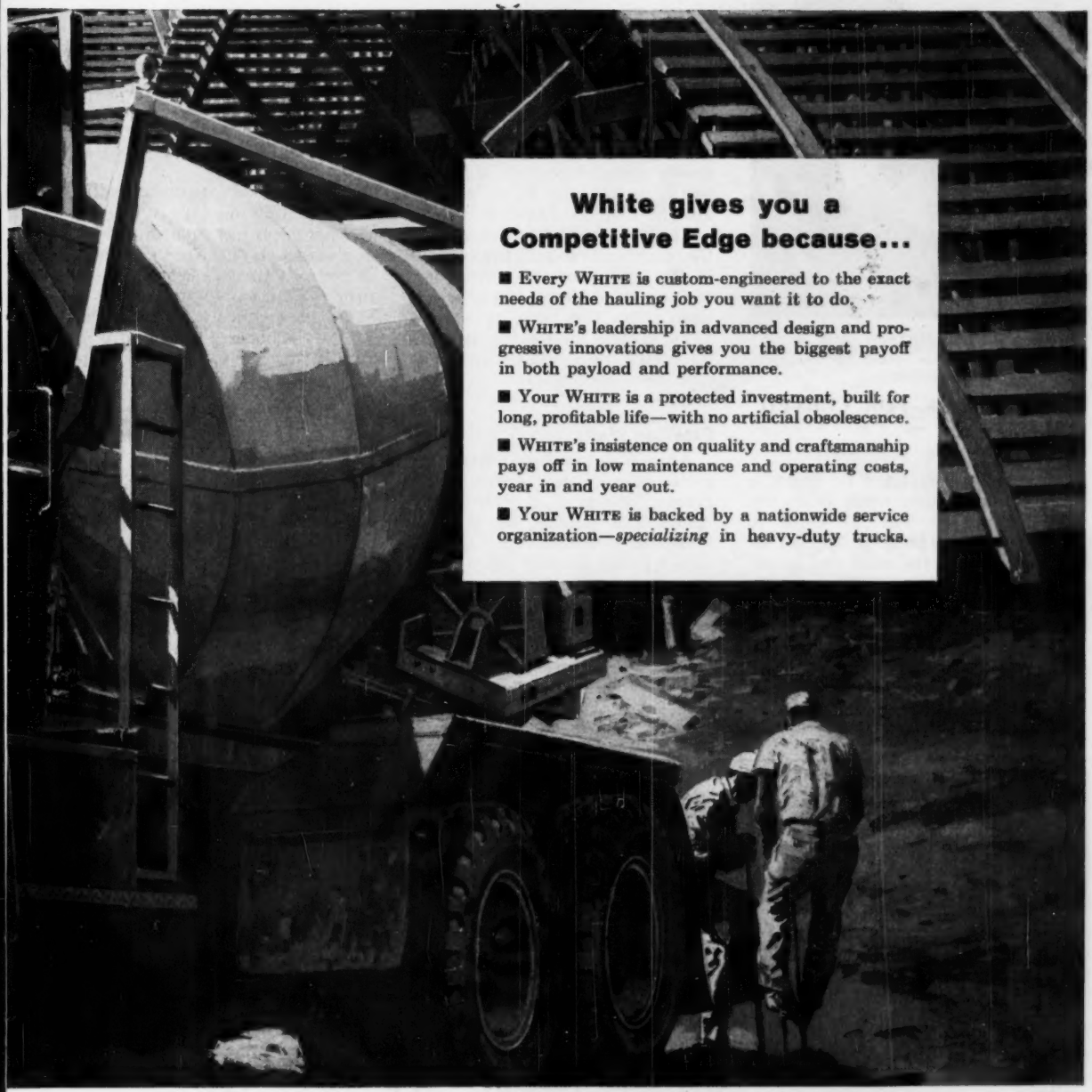
Compact WHITE 9064 (only 62" from center line of front axle to back of cab) puts more weight forward for bigger payloads.

In the '60 Showdown...this White is

All Tough and a Yard More



White gives you a Competitive Edge because...

- Every WHITE is custom-engineered to the exact needs of the hauling job you want it to do.
- WHITE's leadership in advanced design and progressive innovations gives you the biggest payoff in both payload and performance.
- Your WHITE is a protected investment, built for long, profitable life—with no artificial obsolescence.
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- Your WHITE is backed by a nationwide service organization—*specializing* in heavy-duty trucks.

Here's the toughest tandem in the business. It has everything you could ask for—and gives you up to a full cubic yard more payload!

This power-packed WHITE 9064 maneuvers anywhere. Takes your biggest loads in and out of the tightest places and over the roughest terrain. And does it day after day, year after year.

The WHITE chassis for mixers and dump trucks can shrug off the roughest kind of treatment.

Your WHITE 9064 will be custom-engineered for the exact job you want it to do. That's why it will do more work at far lower operating costs. That's why it will give you an edge on competition in the big profit showdown in '60!

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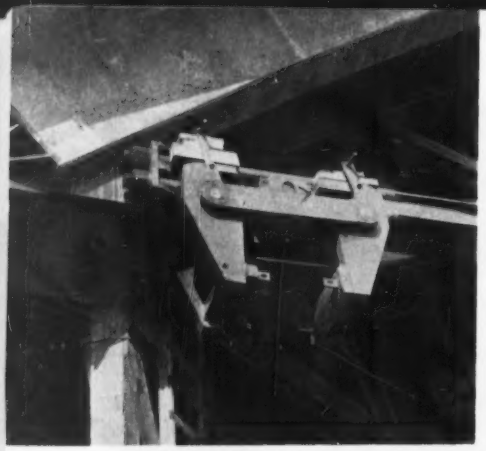
WHITE



TENSIONING—Hydraulic jacks between jaws of this device tension the tie beams.

FORMWORK FOR CURVED ROOF . . .

continued from page 108

At one end of the tie beam, a fixed connection holds it to the column head with 24 bolts. A torque of 1,350 lb is applied to each bolt. At the other end of the beam, four 4½ in. bolts maintain the proper tension in the beam.

It takes four stages to reach a tension of 183 tons along the 140-ft side or 195 tons along the 150-ft side of the roof. A specially designed mechanism — the "nutcracker" to the men on the job— and single-acting Rodgers hydraulic jacks pull one end of the tie beam toward the column while crews tighten the four bolts. Tensioning takes place at two diagonally opposite corners of a roof section while the other corners are the fixed connections.

The horizontal force along the tie beam tends to pull the corners of the arches toward each other, causing the concrete shell to rise about 1 in. The beam tensioning helps to strip the forms. Once the tie beam is tensioned, the roof section becomes structurally independent.

Exterior Walls

As soon as a roof section is completed, crews start erecting the precast concrete curtain wall. About 150 precast panels will make up the wall. One of Gilbane's crews handles all precasting work at the site. Some of these precast panels are quite a headache requiring several openings and as many as 124 inserts.

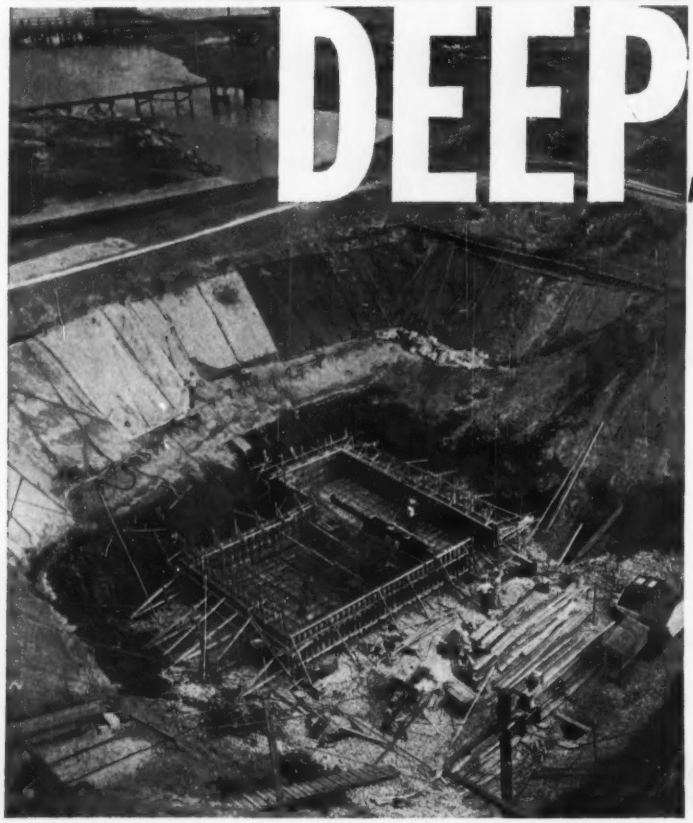
Wall panels are 26 ft high— the height of the tie beam. They are fastened to the beam but get no support from it. Columns that hold a 4-ft wide observation platform and walkway along the inside of all walls furnish lateral support to the wall.

Men on the Job

In charge of construction for Gilbane Building Co., is Richard F. Martin, project superintendent. His assistant is Noe "Whitey" Barrette. Gilbane's project engineer is Charles A. Orne, Jr.

Design engineers handling this job are Charles A. Maguire & Associates. The partner in charge is Frederick H. Paulson. Paul R. Peterson is the project manager, and Lee Para is the structural engineer. Resident engineer is Roger McCloskey.

Intelex Systems Incorporated, a subsidiary of International Telephone and Telegraph Corp., is the owner of the entire installation and designer of the mechanical equipment. The project manager is E. Howard Roorbach, and Wesley R. Larsen is assistant project manager. The facility will be operated by the Post Office Department.



DEEP AND DRY

A Stang wellpoint system is predraining and stabilizing this pump station jobsite quickly, economically and efficiently. The site is clear, conditions are very workable. This is typical of Stang jobs.

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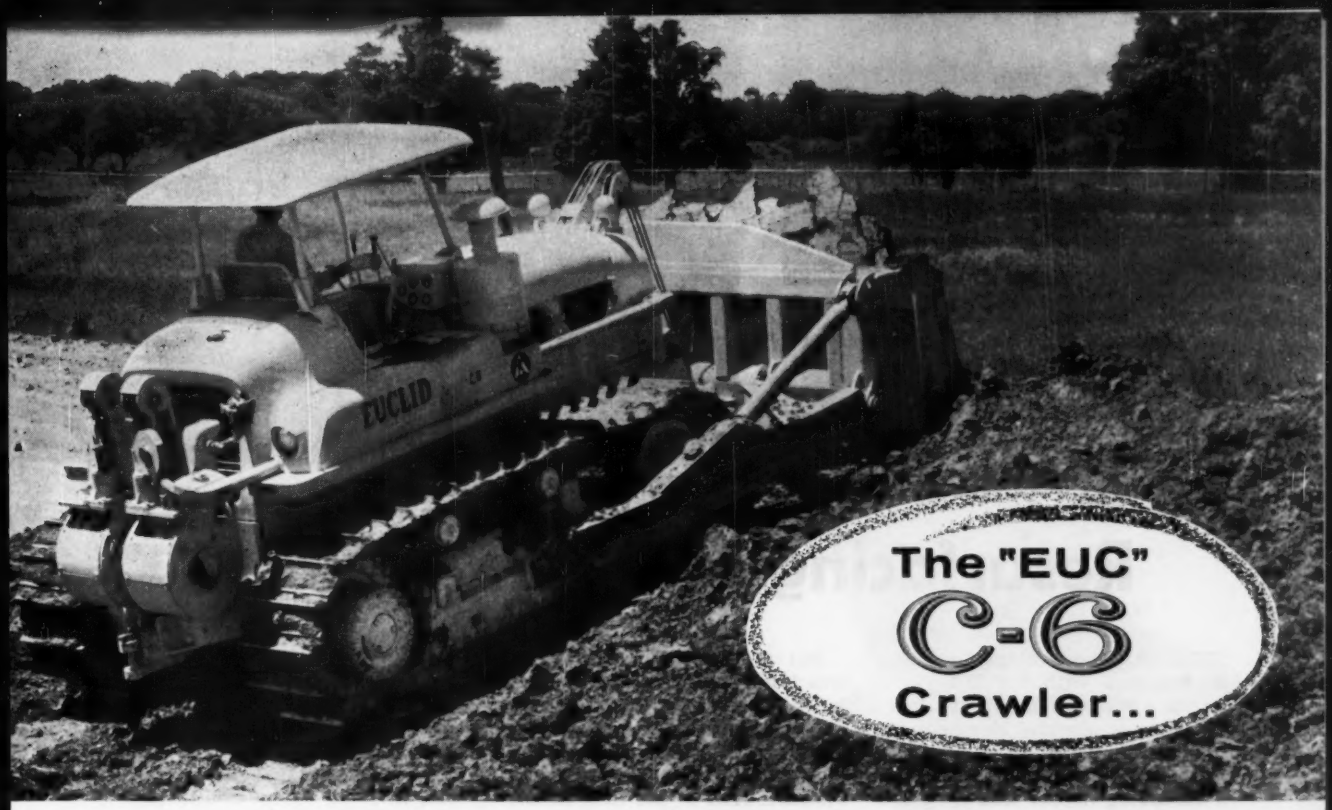

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Proven Torqmatic Drive . . . performance tested and proved in thousands of Euclid earth-movers on the toughest jobs.

Full Power Shift . . . no master clutch . . . easy operation and "fast as a fox" maneuverability that cuts work cycle time.

Fast, Positive Response . . . common steering and braking control, plus Torqmatic Drive for smooth operation on all tractor work.

Better Track Alignment . . . track roller frames are pivot mounted ahead of final drives . . . advanced design of front equalizer bar maintains positive alignment.

Low Maintenance Costs . . . easy accessibility of major components . . . no adjustment of steering clutches and brakes required . . . fewer lube points . . . dry type air cleaner . . . 7 track rollers . . . no tractor weight on final drives . . . recoil system eliminates mechanical springs.

No other Euclid product has ever had the thorough testing—both on proving grounds and on actual jobs—that the C-6 tractor has undergone during the last 5 years. All of the product refinements and improvements resulting from this exhaustive test program, plus Euclid's really new concept of crawler design, make C-6 performance a new standard for comparison in the 200 h.p. tractor class.

Have your Euclid dealer give you the facts and figures on the C-6 . . . compare performance as well as specs with any tractor in its class and you'll see what this new standard of tractor versatility can mean to you in better production and return on investment.

EUCLID Division of General Motors, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

An asphalt tank truck with a front-mounted spreading hopper and spray bar works as a combination spreader-distributor to resurface in one pass.

Resurfacing in a Single Pass

SEAL COAT and chips go down in one-pass with the Bit Paver, a combination distributor-spreader. It operates at speeds as high as 2½ mph.

The unit is a tank truck with a spreading hopper and a spray bar with 37 nozzles mounted in front. The nozzles are under the spreader and deposit the asphalt just ahead of the chips. This arrangement practically eliminates the time lag between spraying and spreading and permits operations in low temperatures or in light rain, weather conditions that might halt resurfacing work with separate spreader and distributor units.

In operation, a dump truck backs up against the spreader and slowly discharges chips into the hopper while the paver moves ahead pushing the truck in front of it. Air controls in the cab operate the hopper gates and spray nozzles.

Middlesex Concrete Products & Excavating Corp. of Woodbridge, N.J., bought their Bit Paver for work on the Garden State Parkway. The work involved widening of shoulders and some resurfacing. They were able to maintain a steady pace of about 2 mph with the paver.

On another job, the rig resurfaced a large parking lot. This was not quite as fast because of frequent starting and stopping. Also, two courses were necessary —the bottom course consisted of ¾-in. aggregate and the surface course was chips.

The contractor's men say the Bit Paver did a good job on the Parkway. It kept on the move, stopping briefly when a new load of chips was backed into place. But they feel that the paver was less efficient on the parking lot job. It could not turn sharp corners with a dump truck in position, and the hopper capacity was too small to cover enough distance. Half of the time on the job was unproductive because turning around or backing up for the next pass took nearly as long as one resurfacing pass. The paver backed up at the end of each pass on the parking lot job.

The Machine

The spreader is 12½ ft wide and has a capacity of about 3 cu yd. Electrically controlled augers distribute the chips over the entire width of the hopper. As the chips leave the hopper, they fall over a revolving cylinder that insures an even deposit of material. A power take-off from the truck's transmission powers the cylinder. The paver speed automatically controls the spreading rate.

Spray nozzles are mounted on 4-in. centers and hooked up in 1-ft groups. This permits the spraying width to be adjusted in 1-ft increments. Nozzles are arranged to cover the entire width without puddling.

Mounted on the rear of the unit is an additional spray bar so the paver can also operate as a bituminous distributor. A hand spray bar on the side of the paver comes in handy for spot applications around obstructions or for patch work.

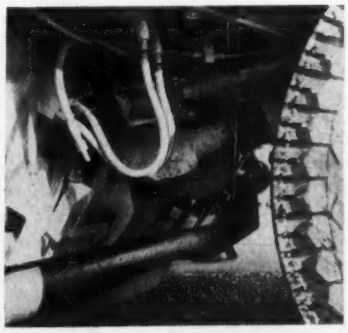
The unit carries its own supply of asphalt in a 2,000-gal tank. An additional tank contains 175 gal of fuel oil for flushing the spraying system at the end of a job. Two thermostatically controlled butane-fired heaters keep the asphalt at the right temperature for spraying.

A Viking positive displacement asphalt pump supplies the emulsion to the spray nozzles. The pump delivers 1 gal per revolution. A 4-cyl, 44-hp Continental engine powers the pump.

Two tachometers record the distance covered. One runs off the engine, the other operates from a fifth wheel that is in contact with the ground only while material is being deposited. This records the actual distance paved.

The rig is 27 ft long and 12½ ft wide. For highway travel the hopper is detached reducing the width to 8 ft. The hopper can be transported on a truck or as a trailer on wheels that can be attached to it. The unit weighs 27,500 lb empty and 50,000 lb when loaded for operation.

Wright Industries of Lansing, Mich., manufacture various components of the Bit Paver and assemble the machine. It is sold by Tanco, Inc., of Akron, O.



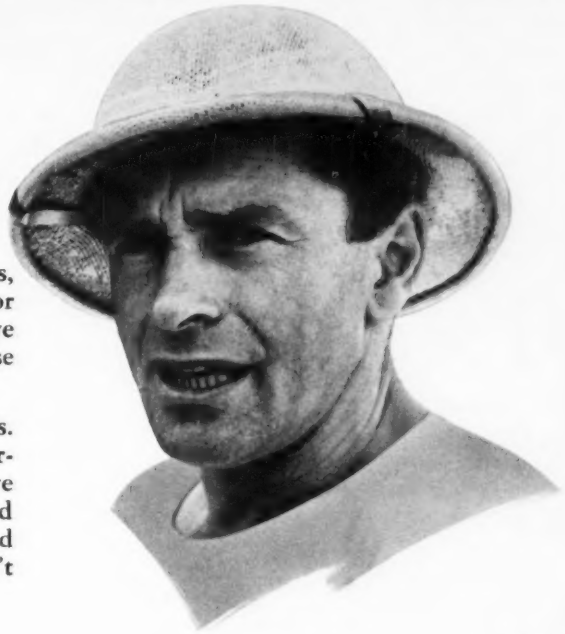
CHIP SPREADER—From the hopper chips fall over a rotating cylinder that spreads the material evenly across the entire width.

4 who bought Ford Tractors . . . and *WHY*

"Price"

says Jackson

president of "Pools of Distinction,"
Jacksonville Beach, Florida.



"We style and custom build swimming pools of all sizes, 15′ x 30′ and up," says Mr. Jackson. "Our Ford tractor digs and shapes the cavity with a backhoe. Then we use the loader to stack earth around the walls and raise the pool level.

"We figure Ford saves us over $100 a pool," he adds. "We're very pleased with our dollar savings in operation and maintenance costs. But these were benefits we learned about by experience. What attracted me to Ford in the first place was price. Comparing features and work capacity with others on the market, I couldn't find anything else to match Ford."

PRICE? THESE ARE THE FACTS WITH FORD*

Ford Workmaster Tractors—$330 Under Average

(Comparison power range—34 to 47 engine HP)

Ford Model 621 tractor's retail list price is $63 less than its nearest competitor among 10 other utility tractors, and $330 less than the average price for all 10—seven of them having less than Ford's 45 engine HP. Ford's price of $48 per engine HP is $5 less than its nearest competitor, and $13 less than the average for all 10.

Ford Powermaster Tractors—$1,138 Under Average

(Comparison power range—51 to 72.5 engine HP)

Ford Model 821 tractor's retail list price is $667 less than its nearest competitor among five other utility tractors, and $1,138 less than the average price for all five. Ford's price of $39 for each of its 62.5 engine HP is $12 less than the No. 2 tractor, and $19 per HP less than the average for all five.

Ford Diesel Tractors—$409 Under Average

Diesel engines are a factory-installed option for all series of Ford tractors. In each power class, Ford costs less than all comparably equipped competitors. Each Ford diesel option costs only $420 more than the same Ford tractor in a gasoline model. Among the nine other more popular diesel tractors, the average mark-up for diesel as compared to gasoline models is $829. Ford's mark-up is $409 less than the average for these other diesels, and $130 less than its nearest competitor.

Ford Industrial Tractors—$474 Under Average

(Comparison power range—51 to 72.5 engine HP)

Ford Model 1821 tractor's retail list price is almost the same as one other industrial tractor in its power class ($3 less, to be exact), but it is $474 less than the average price of the five others in this class. Ford's price of $49 per engine HP is a dollar less than the No. 2 tractor and $8 less than the average for all five. Perhaps even more important, when all of these units are equipped with loaders, Ford is first in breakaway, a close second in rated lift capacity and the leader by a big margin in overall productivity. Ford moved 13 tons of material an hour more than its nearest tested competitor!

*All comparisons are based on tractors equipped comparably to the Ford models cited. Retail list prices are F. O. B. factory and will result, of course, in variations of delivery price according to point of purchase. Comparisons are based on the most recent published data held by Ford at the time of printing, and are believed to be an accurate reflection of suggested retail list prices before addition of shipping charges, state taxes, etc.

4 who bought Ford Tractors . . . and *WHY*

"Dependability"

says *John A Behnken*

president of Behnken Coal and Materials Company of New Athens, Illinois.

"One operator with Ford loads out 200 tons of limestone in 8 hours," Mr. Behnken says. "That's a $600 payload and twice the amount four men used to load in four days. Ford loading efficiency saves coal customers $1.40 a ton. And we gain at least 50c a ton price advantage on quarry materials because fast loading lets us stockpile.

"But probably the biggest thing to me—the reason I'll always buy Fords—is dependability. I've got one tractor 14 years old and another one 10 years old. They've averaged 25,000 tons of rock, sand and limestone, and 6,000 yards of dirt a year ever since.

"Both have been in constant service and with just about everybody among our 30 people operating them at one time or another," he continues. "Yet we've never had a major repair and never had a parts replacement involving either engine!"

DEPENDABILITY? THESE ARE THE FACTS WITH FORD

Over Two Million Ford Tractors

In manufacturing as in most other fields, there's no substitute for experience to produce machines giving the years of dependable performance described by Mr. Behnken and thousands of other Ford tractor owners. Ford has more tractor experience than any other company, today is well on the way toward its three-millionth tractor.

World's First Mass-Produced Tractor

In 1917 the world saw its first Fordson. During the next decade it saw more than 700,000 of them—some three-fourths of all U.S. tractor production. In 1939 Ford introduced built-in hydraulic systems with its model 9N Ford tractor. Sixteen years later Ford produced its one-millionth tractor with revolutionary three-point hitch and hydraulic system.

Birth of the "Red Tigers"

In 1952 Ford produced the first of the "Red Tiger" engines which still today are such a vital part of Ford tractor dependability, Since that time—more than three-quarter million engines ago – they've been refined, given more power, improved in many ways. But each has added to the Ford fund of experience which goes into the production of today's—and tomorrow's—Ford tractors.

Only Tractor Maker with Auto Experience

Ford is the only member of the tractor field with ready access to the production experience, the depth of research and the foresighted engineering of the auto industry. Ford's new and exclusive Select-O-Speed transmission, for instance, drew heavily on the experience gained with planetary gearsets in many millions of Ford autos. Ford Tractor and Implement people are quick to adapt all proven processes and economies to their own production . . . benefits which loom big among the many reasons for Ford's consistently high quality, Ford's traditional low cost.

4 who bought Ford Tractors . . . and *WHY*

"Versatility"

says *Carroll Blackden*

president of Krete Kraft Concrete Products Company of North Hampton, New Hampshire.

"Our Ford tractor and loader paid for itself in less than a year," says Mr. Blackden, whose company is the largest producer of concrete septic tanks in New England. "It enabled us to handle easily a 20% increase in production.

"Considering the constant heavy use this Ford tractor gets, it is a real tribute to its rugged design that our maintenance costs have been so very small. But I believe the biggest Ford feature is versatility. Our tractor works about half-time loading aggregate and pouring cement, about half-time storing and truck-loading distribution boxes, tank covers, etc.

"In addition," Mr. Blackden says, "the unit is used for occasional work in home construction, and for snow removal at the plant about 10 days a year. It's the steadiest worker on the job and the most versatile piece of equipment we have."

VERSATILITY? THESE ARE THE FACTS WITH FORD

Wide Range of Tractors

Ford offers a line of tractors with power and equipment for almost any materials handling or grounds maintenance job. Six different Workmasters, five Powermasters and five Ford Industrial tractors—all with diesel engine options which in effect double the selection to 32 models. They range from Special Utility models—for drawbar operations and work not needing hydraulic systems—up through fully equipped tractors with the new Select-O-Speed transmission and two-speed power take-off. Ford also offers Utility and All Purpose models of the big Fordson Power Major Diesel, the new Fordson Dexta Diesel, and both Standard and High Clearance models of the new Ford Offset tractor for nurserymen and landscapers. With Ford you choose your weight, your power, your tractor equipment and your work capacity . . . select exactly the right tractor for *your* job.

Wide Range of Basic Attachments

You'll find exactly the right Ford attachment for your job, too. Loaders with 1,000 to 2,500-lb. rated capacity; 10 ft., 12 ft. and 14 ft. backhoes; 6′ or 7′ front and rear blades; 65″ to 80″ rollover and box type scrapers; tiller rakes; 60″ and 100″ rotary cutters; 6′ and 7′ cutter bar mowers; 6′ and 8′ lime and fertilizer spreaders; cordwood saws, posthole diggers and many other attachments designed to save time, men and money on dozens of jobs.

And an Ever-Growing List of Specialized Equipment

Your Ford Tractor and Equipment dealer also sells many other attachments for Ford tractors. Brooms, winches, fork lifts, air compressors, side booms, sprayers, aerating tools, rollers, trenchers, pumps, reel mowers, compactors, portable welders . . . the list seems almost endless, and in almost every case fulfills a real need in replacing costly hand labor. Just give Ford a try. You'll soon find it's the busiest worker on your job.

4 who bought Ford Tractors . . . and *WHY*

"Service"

says *Carmen Oliver*

partner, Oliver Bros. Landscaping of Tonawanda, New York.

"We take over landscaping jobs two or three inches from finished grade," Mr. Oliver says, "and spread top soil, rough grade, backfill foundations, finish grade, seed and fertilize. Three Fords with loaders, blades and other attachments are operated 10 to 12 hours a day, six days a week.

"Ford has cut our operating costs at least 50%," he adds, "and in 24 years of operation—the combined total of the four Fords we've owned—we've never yet had any significant down time.

"We practice our own preventative maintenance and dealer service is seldom needed. When we *do* need our dealer, though, he always comes through for us. The service is excellent and you can understand how important that is to us when you watch how much Fords are a part of our day-to-day operation. We just couldn't afford any major down time."

SERVICE? THESE ARE THE FACTS WITH FORD

Wherever You Are, Ford's Not Far

In every state, in almost every county in the United States, there's a dealer, distributor or manufacturing plant for the Tractor and Implement Division of Ford Motor Company. You're only a few hours, at most, from dealer parts stocks . . . only a phone call away from the even bigger stocks held in reserve by Ford's 29 Distributors and Sales Districts.

Ford Reputation on the Line

When you buy Ford tractors and equipment, you also receive the "job security" of an authorized Ford Tractor dealer's parts and service warranty. You're also buying the future bonus of Ford's excellent trade-in values.

See Your Dealer Soon

These are just a few of the many reasons why Fords are replaced with Fords, and why more companies add Ford to their equipment every week. Owner satisfaction stems not just from the product, but to a large extent from the man who sells it and keeps it working. Have you talked to your Ford Tractor and Equipment dealer lately? He's selling the most basic job needs—economy, dependability, versatility and service. He's selling satisfaction. Get yours right away!

TRACTOR AND IMPLEMENT DIVISION • FORD MOTOR COMPANY • BIRMINGHAM, MICHIGAN

Ford

INDUSTRIAL TRACTORS AND EQUIPMENT

you to train new drivers?

$1,000? $1,500? $2,000? These are normal costs for training new operators —except for TORQMATIC DRIVE owners. They report saving up to $2,000 every time they break in a "rookie."

Reason? TORQMATIC takes guesswork out of shifting – ends shock-load damage and the need for engine-disconnect clutch repairs. TORQMATIC *automatically* adjusts engine output and speed to load or terrain changes.

TORQMATIC owners know that no operator can handle the "stick" and clutch as smoothly and efficiently—*every* time – as an Allison TORQMATIC. They bought TORQMATIC because they know, too, what it costs when rookies make a shifting and clutching mistake.

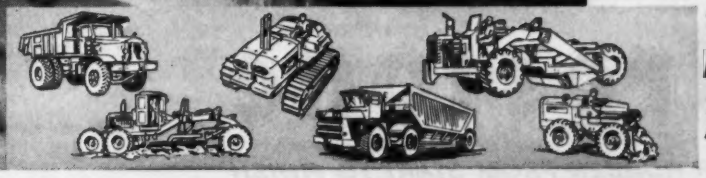
How can you eliminate these costs?

Look beyond first cost and see the total cost. Then change from clutch-pedal equipment to Allison TORQMATIC. You'll save costly engine-disconnect clutch replacements, too-frequent overhauls of overtaxed engines, repair bills for shock-load-damaged axles and drive lines.

Why not get the full story today? See your equipment dealer or write Allison.

ALLISON DIVISION OF GENERAL MOTORS
Indianapolis 6, Indiana
In Canada: General Motors Diesel Ltd.,
London, Ontario

Allison TORQMATIC



TORQMATIC® DRIVES

THE MODERN DRIVE FOR MODERN EQUIPMENT

Where heavyweights move job records prove...
FIRESTONES CARRY MORE YARDS PER DOLLAR!

Get Firestone off-the-highway tires and get set to make more money! From planning stage to the finished project a combination of Firestone tires and Firestone Giant Tire Service adds up to bigger profits every time. Every Firestone off-the-highway tire is built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires. You get Firestone S/F (Shock-Fortified) nylon cord bodies to guard against impact damage. A *Firestone Tire Expert* will help you match tires exactly to the job and will handle all of your tire maintenance problems to turn downtime losses into worktime profits! Call your Firestone Dealer or Store today!

Always specify Firestone Tires when ordering new equipment

Super Rock Grip Wide Base (Nylon)* Super Rock Grip Deep Tread*

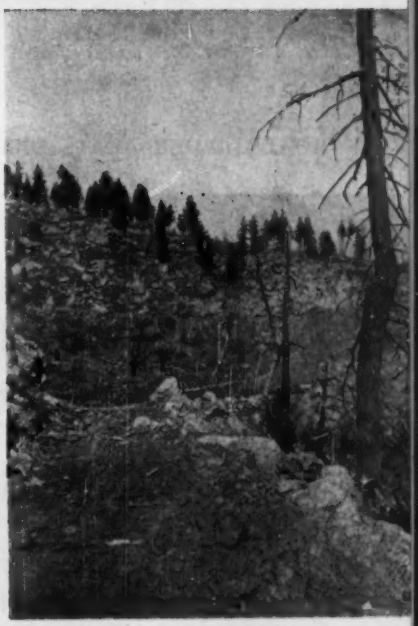
Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1960, The Firestone Tire & Rubber Co.

*Firestone T.M.

Faced with a winter deadline, a Colorado contractor poured all the men and machinery he could get onto a rugged 4½-mi road job. Working seven days a week, he finished in 43 days.



ROCKY ROAD—Contractor opens up almost inaccessible site by dozing pioneer roads first. Dozers removed many of the rocks by pushing them over the side of the mountain. Scrapers handled smaller boulders.

Roadbuilder Beats Deadline On Tough Mountain Highway

"NEVER in our experience has a tougher assignment been completed in a shorter time."

That's the way veterans in the Corps of Engineers described construction of a 4½-mi access road up the face of Cheyenne Mountain, just outside Colorado Springs, Colo.

The road leads to the construction site of what will be a subterranean fortress to house the nerve center of the North American Air Defense Command. Norad is a joint U.S.-Canadian agency established to alert the continent to air attack and to direct its defense and retaliation.

Hopkins Construction Co. of Denver, Colo., had a $923,000 contract to build the road. They weren't awarded the contract until September, but the Air Force wanted the work finished before winter so that they could proceed with construction of the headquarters itself during the winter.

Hopkins started work on September 23. They worked almost around the clock, seven days a week with every piece of equipment they could crowd onto the site. By November 22, only 43 working days later, they had finished the job.

This breakneck speed would be unusual on any road job. But considering the additional problems Hopkins ran into, their feat of building the road in 43 days was phenomenal.

Here's the sort of thing they were up against.

- Heavy equipment had to be boosted up 45% grades.
- Machines had to work on a mountainside so strewn with boulders—many bigger than a house—and so thickly palisaded with trees that a man could walk only with difficulty.
- Removal of a number of rock ledges required $20,000 worth of dynamite.
- The deepest cut was 89 ft; the deepest fill was 93 ft.
- To top it all off, an unseasonable 3½-ft snowfall tied up the job for 10 days.

Daring Bid

In their bid, the Hopkins firm took a calculated risk both on the weather and on their technique. Their price was $125,000 under the Army Engineers' estimate and $100,000 under the next bid. Hopkins figured to work the job primarily with scrapers; the other bidders planned to use shovels.

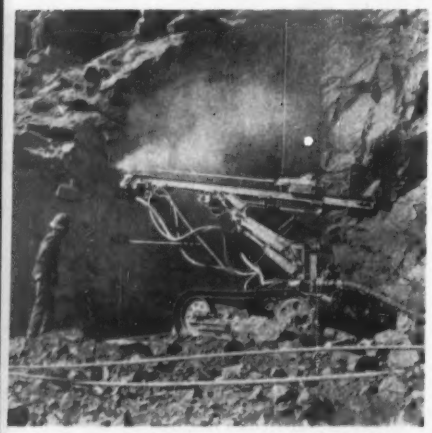
"We were the only ones who believed the rock could be moved with dozers and scrapers rather than shovels," said W. C. Hopkins, president of the firm, "and we saved time and money doing it.

Lots of Boulders

Hopkins noted that although there were a great many boulders on the site, they were widely scattered. He felt that too much time would have been lost relocating shovels.

The excavated material was 20% granite boulder extrusions; the remainder was a conglomerate of decomposed granite, clay, and sand.

Hopkins brought in 20 Cat D8 tractors, one D9 and six International-Harvester TD-23's. The D9 and five of the D8's were equipped with hydraulic rippers. The rippers did not shatter the granite boulders, but they did lift them out of the soil so they could be dozed over the side of the



DRILLING—Track-mounted rig drills blast holes on one of many rock ledges on site.

mountain. The largest boulders were drilled and blasted.

The more manageable conglomerate material was handled by two Cat DW20 scrapers, four Euclid TS-24's, and three I-H 75's.

Flood of Equipment

Hopkins worked the job fast and hard. To gain time, the firm started work as soon as they learned they had made the low bid, taking a chance that the contract award would follow. They worked a 20-hr day, 7-day week from start to finish.

They smothered the project with men and equipment. During the peak of the operation they had 372 men and $3 million of equipment on the job.

Hopkins pulled machines off other jobs wherever they could. And they hired operators and machines from all over Colorado.

"We drained the state of machines," said Hopkins. On the job were as many as 27 dozers, 8 self-propelled scrapers, 5 tractor-drawn scrapers, 9 motor patrols, 2 shovels, and 7 water trucks.

At one time 27 machines—some of them big TS-24 Eucs—were working an area 800 ft long. There were so many machines that a circular traffic pattern had to be set up. One machine followed another like a tail-and-trunk procession of circus elephants.

Because the road is Y-shaped, Hopkins worked the job in three spreads. The base leg runs from Highway 115 across piedmont country for 2½ mi. Then it forks. One branch is a 4,900-ft leg running to what will be the south portal of the cavern. The other leg extends 3,600 ft to the north portal.

One spread was assigned to the base leg and one to each of the branches. Work went on almost simultaneously along the entire length of the road.

The base leg runs over high upland plains. It was the easiest to build; the crews carved it out in six days. Grades on this section ranged up to 6% compared to an 8% maximum on the other legs.

By contrast, the upper branches were in such rough terrain that geological exploration crews who were test drilling for the design of the cavern, were unable to get in by land. They had to haul their drill rigs to the site by helicopter.

But Hopkins brought in machines over this same terrain to build the road. They made extensive use of pioneer roads. First step was to clear and grub the right of way. A crew of 170 men with power saws cut the trees. Then Cat D8's clawed their way up a 45 deg slope to root out the stumps.

Once the pioneer roads were cut the drills and compressors could get in. They drilled and shot all boulders over 48 in. dia. Then scrapers took off a layer of rock to expose more big boulders. The drills returned, and the cycle was repeated. The excavation was peeled off in layers by a combination of shooting and scraping.

Of the 490,000 cu yd of excavation on the job, the scrapers moved 80%. The job included 28,000 cu yd of solid ledge rock and 20,000 cu yd of big cobbles.

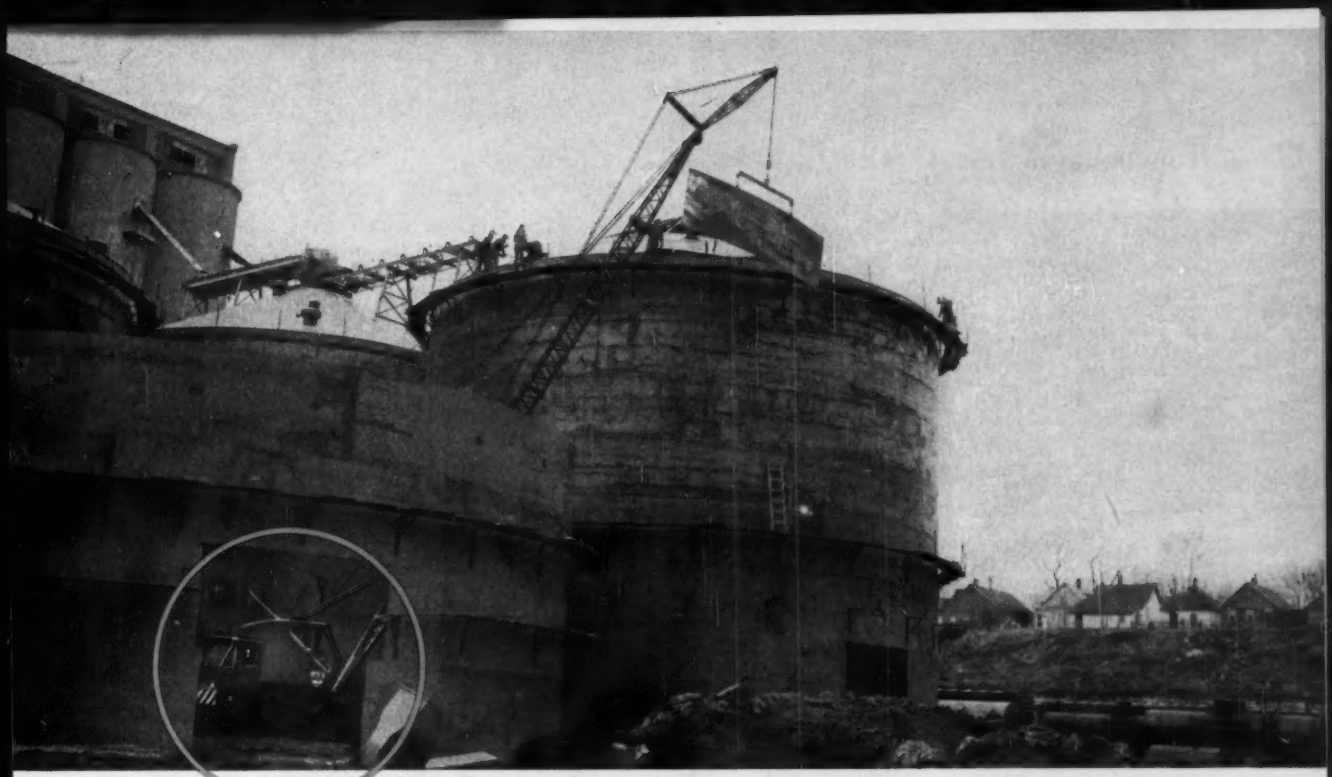
In shooting this rock Hopkins gained a few seconds of working time at each blast by using a delay pattern. This minimized the distance that equipment had to be moved back during the blast. Also, the shots were scheduled as nearly as possible to 11 am and 3 pm when equipment was being shuttled back and forth from one spread to another. This sort of close scheduling resulted in maximum production from the machines; they consistently moved about 5,000 cu yd per shift.

Drainage System

Putting in the drainage system was tricky. There are 80 culverts ranging in size from 24 to 80 in. Because of the steep slopes and the narrow 200-ft right of way, earthwork operations could not go around the culverts while they were being built.

Hopkins put in the culverts piece by piece. While traffic used one side of the road, a backhoe made the excavation for the culvert on the other side. A crew put the pipe section in, covered it, and packed the earth with hand tampers. Traffic then rolled over this section while the culvert

SCRAPER OPERATION—About 80% of the excavation was removed by scrapers. Rocks larger than 48 in. dia were drilled and blasted first so scrapers could handle them.



Tight quarters . . . ticklish spotting job?

You can do it with a NEW T-350 BANTAM

BANTAMS are the handiest rigs!

They are *sized* to be—with an amazing travel and work ease that hastens the trip, hurries the job. And now, with the all-new BANTAM T-350, you get stepped-up performance and ability to profit from full 11-ton capacity . . . to handle more and bigger jobs than ever before.

Practical size, biggest capacity

For example, here a new BANTAM T-350 with 65′ boom and 15′ jib works inside a partially completed steel storage bin to speed the construction of an adjacent bin. The BANTAM simply "drove right in and went to work"—handling the large steel plates with ease, and spotting accurately with BANTAM's precision-touch mechanical controls, inch-at-a-time power load lowering and safe, accurate power lowering boom hoist (optional).

You'll be money ahead with a new BANTAM T-350, whether it's heavy-duty crane work or any assignment where BANTAM's famed 11 fast-change attachments can speed the job. Choose from the industry's widest choice of equipment options—including four BANTAM-built carriers . . . increased gasoline, diesel or LP-gas power . . . torque converter . . . three different boom hoists . . . house-type or all-vision cab.

All-New, too, BANTAM C-350

America's most modern crawler—with highest earnings for its size. Check BANTAM C-350's surprising work speed and ease. Full-reversing, 2-speed transmission and digging lock with in-cab control are standard. Digs to 18′10″ with new, optional long-boom back hoe. New, hydraulically actuated backhoe bucket (shown) rushes toughest digging jobs. Capacity to 8 tons. Also see new BANTAM CR-350 self-propelled—versatile contractor's tool for digging, lifting, handling, stockpiling jobs. 11-ton capacity.

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221 Park Street, Waverly, Iowa

WORLD'S LARGEST PRODUCER OF TRUCK CRANE-EXCAVATORS

See how you can earn more with a versatile NEW 350 BANTAM

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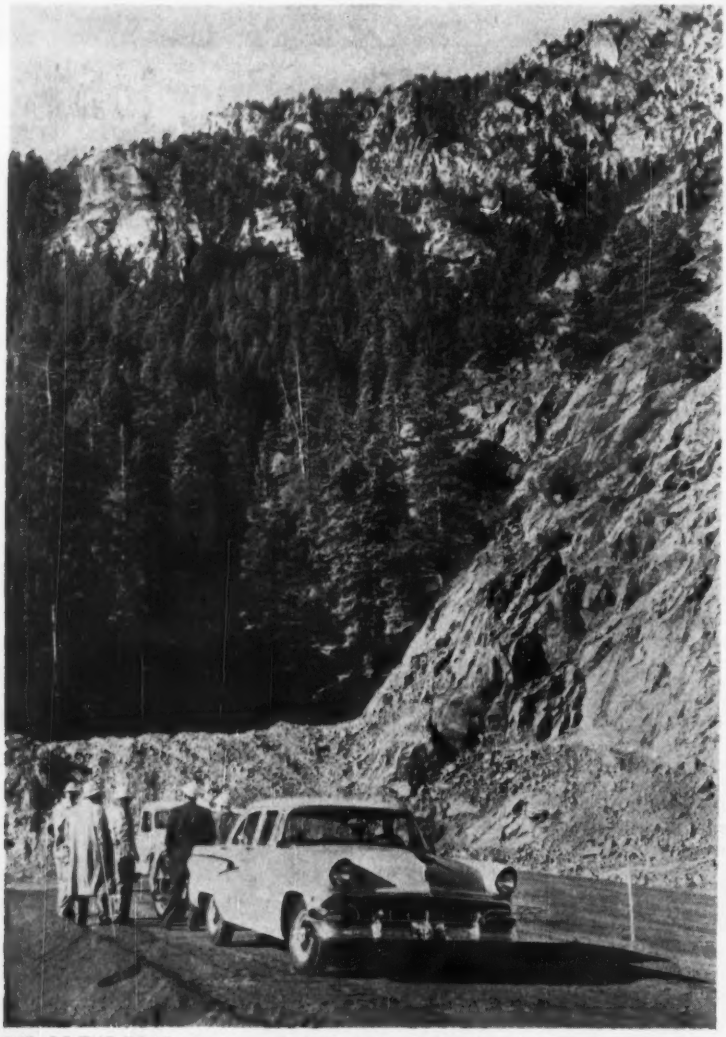
BORROW PIT—Conveyor loads selected material on trucks for road topping. Borrow pit is 2 mi from road site. Depth of the topping varied from 4 in. to as much as 24 in.



END OF THE ROAD—Engineers check final phases of road work. One of the tunnel entrances to underground Norad headquarters will be blasted out of rock cliff at right.

crew moved ahead to put in pipe across the other half of the road.

Headwalls and other concrete structures were not put in until the end of the job. A 1½-yd Lorain crane with a 2-yd bucket handled the concrete work. An elephant's trunk on the bucket allowed the crane to pour concrete up to 70 ft from the road.

The road was topped with 38,500 cu yd of selected material brought from a borrow pit 2 mi from the job site. Two Vibrapac rubber-tired rollers compacted it to 95%.

Depth of the top material varied with the base material. On non-granular material only 4 in. was required. On rock cuts, the topping was 10 in. thick. On the grannular material the selected topping was 24 in. thick.

Weather Problems

Hopkins would have finished the job even sooner than they did, had the weather been reasonable. Shortly after they started, a late September storm dumped 41 in. of snow on the area. This closed down the job completely.

The subsequent thaw was a nightmare. A fleet of rippers, discs, and tampers worked two weeks on a 100-ft stretch of fill to get it dry enough to compact. To get supplies in, tractors had to accompany every truck. Even the tractors bogged down; sometimes as many as three would get stuck at the same time.

During the later stages of the job, cold weather made things tough. Equipment sometimes had to stand by in the morning until the sun had thawed the frost enough for compacting to start.

The entire project will cost about $30 million. Next phase is to drive two 32-ft tunnels into the sides of the mountain. These will be crossed by three 45-ft tunnels. The cavern will be dug near the middle of this criss-cross pattern and will contain a three-story steel structure equipped to house and feed 1,500 people for a week.

The access road was constructed under the direction of the Omaha District of the Corps of Engineers. Col. David G. Hammond is district engineer. Ralph Rader is chief of military construction. Tom Cosgrave was in charge of field work. D. R. Rundle was project manager for Hopkins.

HIGH RIVER STAGE 433, BONE-DRY SUBGRADE 403. 30′ OF WATER PERFECTLY CONTROLLED BY A MORETRENCH WELLPOINT SYSTEM

Fruin-Colnon Contracting Co. made record time in excavating this deep substructure for Unit #3, the new 200,000 KW turbine generator and boiler unit of the Meredosia, Illinois,power station for the Central Illinois Public Service Company.

Material was medium to coarse sand, and gravel. During high flood stage of the Illinois River, Moretrench Wellpoints pumped 7500 GPM to keep the subgrade dry.

For Moretrench this is a return engagement. In 1947-48 we predrained the foundations for Units #1 and #2.

For nearly thirty-five years contractors all over the world have relied on MORETRENCH for outstanding pumping performance. Take advantage of our years of experience – and top-notch equipment—to get your job going—

IN THE DRY!

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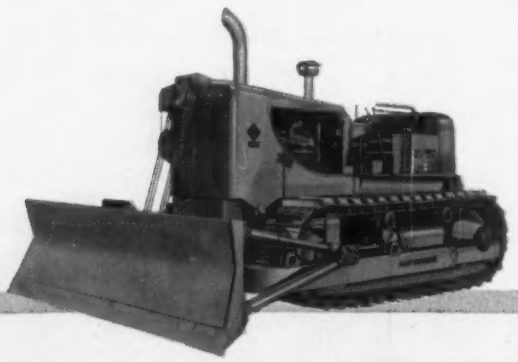
MIGHTY... HEALTHY... POWER

Whether your choice is the 225-hp HD-21 or the 150-hp HD-16, you get from 8½% to 27% more efficient engine operation than from other crawlers.

This fuel-pinching efficiency is a fact! Your Allis-Chalmers dealer will show you actual proof of up to 27% fuel savings in the Allis-Chalmers 16000 or 21000 engines over units of comparable size. He'll tell you why they run cleaner . . . how they "sip" fuel to earn the title "industry's healthiest engines."

Six crater-shaped pistons develop 225 hp in the HD-21, 150 hp in the HD-16 . . . both at an easy 1825 rpm. Coupled with torque converter drive, they provide plenty of rough dozing lugability . . . all the power you'll ever need.

These big Allis-Chalmers tractors are built for mighty tough service. Shock-absorbing all-steel main frame, durable double-reduction final drives, certified permanent lubrication of tapered roller bearing truck wheels, idlers and rollers, and extra tough track keep them going season after season with a minimum of maintenance. Your Allis-Chalmers construction machinery dealer will be glad to show you an HD-21 or HD-16 soon. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



move ahead with

ALLIS-CHALMERS

power for a growing world

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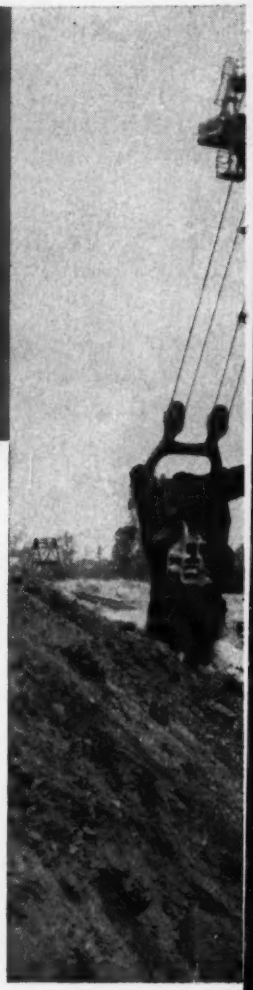


The *UNIQUE Wire Rope Organization

**Single in Kind or Excellence*

Customers can be credited for Union's outstanding position.

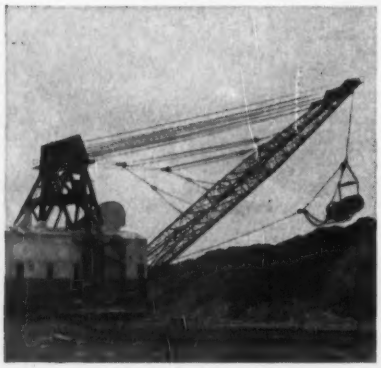
Why? Simply because in large numbers they accepted Union's standing invitation to share their wire rope and sling problems with Union's technical, research and engineering staff.

In meeting these challenges, Union has compiled an outstanding record in wire rope advancements. Some 1600 standard wire rope constructions are in day-to-day production under statistical quality controls which insure "the ultimate low cost rope." This means quality so good that it costs less in the long run.

In searching for better answers to wire rope and sling problems for customers, Union engineers developed the famous family of Tuffy wire ropes and slings.

Each member of the Tuffy family is of a special construction tailored to one of the tougher wire rope jobs. In the Tuffy constructions there is balance—the right combination of strength, flexibility and resistance to wear for better performance and greater safety. When you say Tuffy, you specify the "Ultimate low cost" wire rope or sling.

Tuffy® Wire Ropes and Slings



Tuffy Balanced Dragline Rope

Tuffy Balanced Scraper Rope

Tuffy Balanced Dozer Rope

Big Paul, The King of Spades, world's largest electric power shovel. In taking a 105 ton bite (2 rail carloads) it imposes a maximum bail pull upon the wire ropes of 550,000 lbs. One-half mile of wire rope is required in its operation by the Peabody Coal Company at its modern River King Mine, Freeburg, Ill.

Look Up Your Union Distributor In Phone Book Yellow Pages

He's selected for his ability and willingness to supply you with the right Union standard or Tuffy wire rope construction, to check for proper installation and coach your operators in proper use to get the ultimate in service life. He is backed up by a nearby Union branch office and warehouse. If you would like to receive Union's Rope Dope Educational Bulletin, write Union Wire Rope Corporation, 2270 Manchester Ave., Kansas City 26, Mo.

Tuffy Wire Rope Tips on Safe Use of Wire Rope and Slings

On the Blink from a Kink

Mishandling of rope caused this open kink. Avoid kinks by proper winding on the drum. Never pull a loop smaller. Enlarge it, then straighten out the rope.

Overloaded - Soon Exploded

The rated capacity of a wire rope is based on breaking strength divided by the load factor for particular type of service. Grade of steel, type of construction and size of rope determine tensile strength. Unless rope is properly related to loads, costly and dangerous early failures are likely to occur.

Mangled in a Wedge Socket

Here's a result of improper socketing, caused by poorly designed or worn-out wedge socket. Can be costly and hazardous!

Victim of the "Bends"

Excessive bending of rope speeds up wear. General rule: use more flexible ropes as bending stresses increase (with decrease in tread diameter of sheave or drum). If sheaves are too small, early rope failure is certain.

Would you like a copy of a booklet in which more than a score of Tuffy Tips like those above are reproduced. If so, write Union Wire Rope Corporation, 2270 Manchester Ave., Kansas City 26, Missouri.

Tuffy Balanced Slings and Hoistlines

1-C

UNION Wire Rope

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
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220 H.P. *the most powerful –*

42,000 LBS. *the heaviest.*

GALION T-700 MOTOR GRADER

the world's largest.

GRADE-O-MATIC features assure you UNMATCHED WORK CAPACITY.

- **AUTOMATIC multiplication of torque (torque converter)**
- **AUTOMATIC application of power as needed (power-shift transmission)**
- **AUTOMATIC regulation of working speed (tail-shaft governor and decelerator)**

This kind of power and control makes possible and practicable its 14' x 30" x 1" hydraulically shiftable moldboard – the most blade capacity ever built into a motor grader.

For new ease and accuracy in handling, you get Galion's combination manual with power booster steering. For ample traction and flotation, you have six 16.00 x 24, 12 ply, interchangeable tires.

The T-700 has the most improved steering mechanism, most efficient circle reverse, and most secure attachment of drive wheels to stub axles ever devised.

***Its weight balanced to horsepower* produces the tractive effort that gives you the most PUSH POWER at the blade, ever developed in a grader.**

THE GALION IRON WORKS & MFG. CO.

General and Export Offices Galion, Ohio, U.S.A.

Cable Address—GALIONIRON, Galion, Ohio

GALION ESTABLISHED 1907

MOTOR GRADERS & ROLLERS

IT'S AN UNUSUAL FOUNDATION—Among the piles in the level floor of this 470x750-ft excavation McCloskey & Co. cuts pits that will form keys anchoring the massive concrete base slab. Sheetpile cofferdams enclose the deeper pits that below ground water level.

Keys Anchor Foundation Slab

Hydraulic rigs working in close quarters between piles cut pits into foundation to form keys anchoring the base slab.

KEYS cast into the bottom of the base slab dig into the underlying soil like the cleats on a football player's shoes to anchor the foundation of a new office building for the House of Representatives in Washington, D.C.

The bottom of the massive 470x750-ft concrete slab has hundreds of projecting keys. They vary from 4 ft square up to about 50 ft square and in depth from 2 ft to about 10 ft. Sides of the keys slope at 45 deg angles. Ridges between the keys usually are about 8-ft-wide. In each key there is a cluster of from 4 to more than 40 piles.

Contractor McCloskey & Co. of Philadelphia first excavated down to plan elevation of the bottom of the base slab. Rigs working on this level floor then drove the pile clusters. Next Gradalls working in close quarters between the piles excavated 90% of the material in the keys. Finally, after shaping up the slopes by hand and covering the ridges between keys with a thin layer of mortar, crews concreted the slab to complete the foundation.

Why didn't they cut out the pits for the keys before driving piles? This would have eliminated the precise digging between the piles, but vibrations set up by the piledriving might have broken down the sloping sides of the ridges that separate the keys. Besides, piledriving rigs would have found it difficult to work in the maze of pits.

Site Was a Swamp

Unusual soil conditions dictated the unusual design of the foundation. Originally a swamp, the site now is largely filled in. The soil is wet and unstable. Water from underground springs percolates upward and creates hydrostatic pressure against the bottom of the base slab. And the weight of adjacent structures (neither the nearby Capitol Building nor the House Office Building across the street are supported by piles) will tend to push the foundation slab out of place horizontally.

The heavy concrete slab acts like a raft floating at the bottom of the excavation. It's designed to resist both upwards and sideways displacement. The frictional resistance of the piles, together with the weight of the massive slab, resist uplift pressure; the keys cast in the bottom of the slab resist sideways pressure.

When they opened up the job a year ago, McCloskey brought in two draglines—a 2-yd Koehring and a 2½-yd Bucyrus-Erie—plus three Caterpillar front-end loaders to excavate the foundation. Depth of the excavation varies from 35 to 70 ft. The job calls for a total of 490,000 yd of excavation.

To shore the deep pit, McCloskey drove 14WF72 soldier beams at 5 ft, 10 in. centers and inserted 4x6-in. timber sheeting between the flanges. Altogether the job requires 3,200 soldiers.

The bracing system has to be brawny—earth pressure reaches

First They Excavate, Then Drive Piles in Clusters

EXCAVATING— A 2½-yd Bucyrus-Erie dragline loads trucks while a Caterpillar front-end loader cleans up. Excavation will total 490,000 yd.

PILEDRIVING—A Lima crane—one of three rigs on job—drives a 10-in. pile to average depth of 60 ft in 20 min.

a high of 1,500 psf at the deep end of the excavation. Heavy 14WF95 rakers (250 of them in all) brace the soldier beams. Double 14WF87 walers added between soldiers at 10 ft vertical intervals seat the top ends of the rakers. Heavy steel tripods that later will be cast into the concrete base slab anchor the other ends of the rakers. All connections in the shoring system are welded.

Rough grade of the bottom of the base slab is about 5 ft above normal ground water. But ground water level varies somewhat with the tide, which has a 4-ft stage. A seam of highly permeable gravel carries underground water from the nearby Potomac River to the site. At high tide, ground water level rises above the bottom of the deeper keys.

Sumps Lower Water

McCloskey installed pipe pile sumps to control ground water level. They drove 18-in. pipe piles with closed ends to a depth of about 30 ft. Then they broke open the tips and filled the piles with gravel. Four 2-in. Jaeger pumps withdrew water from the drains, and foundation work proceeded in the dry.

Three cranes—an American, a Lima, and a Northwest, all equipped with 120-ft leads and Littleford steam generators — drove the 10¾-in. Armco Spiralweld piles. The Vulcan O single-acting steam hammers took about 20 min to drive each of the 9,600 piles to an average depth of 60 ft.

Then one of three Gradalls on the job moved into a completed pile cluster to cut out the depression forming the key in the bottom of the base slab. The arm action and bucket control of the rigs made them ideal for the precise work involved. They maneuvered well in the narrow lanes between pile clusters, and their ¼-yd buckets fitted easily into the 36-in. gap between piles.

The Gradalls practically eliminated time-consuming hand labor; they cut out about 90% of the material that had to be excavated and handled shaping the sloping sides of the keys. Each of the hydraulic rigs averaged 150 yd per day.

A few of the deeper keys go below ground water level. For these McCloskey placed sheetpile cofferdams, drove piles, and excavated within the cofferdams. The sheetpiling toed into the gravel at least 3 ft.

Mortar Molds Ridges

After final shaping by hand, crews spread a mortar mixture of three parts cement and one part sand over the sloping sides and tops of the ridges separating keys. This ½-in.-thick layer of mortar held the soil in place, molding it into a smooth form for the concrete.

Concrete for the base slab was supplied by a 70-yph Fanning-Shuett concrete plant equipped with a 3-yd T. L. Smith tilting mixer. A Rex pumpcrete unit pumped concrete to the pour area. The job will require a total of 100,000 yd of concrete.

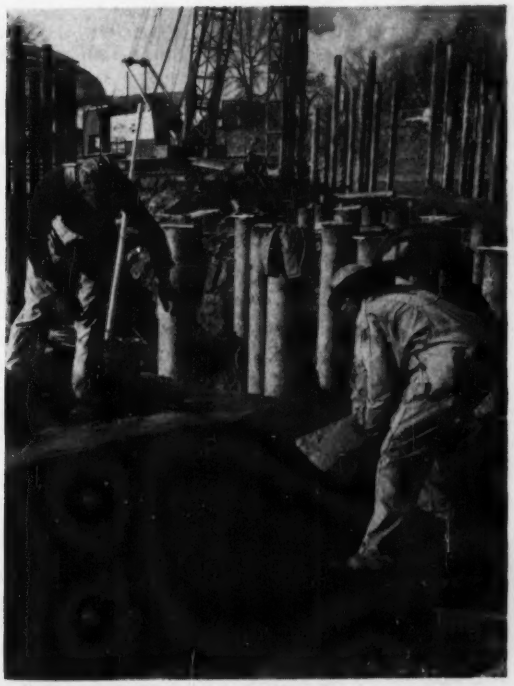
Virtually completed now, McCloskey expects to wind up the job on schedule by April. General superintendent in charge at the site is Howard Massey. Jack Dahl is field superintendent. Thomas L. Pierce supervises construction for the Architect of the Capitol, J. George Stewart.

Next Rigs Cut Pits Among Piles

CUTTING KEYS—Gradall bucket digs material in 36-in. gap between piles. Each of the rigs excavates about 150 yd per day.

SHAPING SLOPES—Gradalls also shape the 45-deg sloping sides of the keys. They handle 90% of the material excavated from the pits.

Finally Crews Mortar Sides of Keys



COVERING WITH MORTAR—Workmen place a ½-in.-thick layer of mortar over sides and top of the ridges separating keys.

PREPARING FOR POUR—Concrete pumped from 70-yph Fanning-Shuett plant will form massive base slab that reaches a thickness of 20 ft.

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With one of these Cedarapids Portable Plants you can meet the toughest Interstate specifications — and bid your jobs with full confidence that Cedarapids' extra-high production, with less maintenance requirements than most smaller capacity plants, will give you maximum profits on your bid price.

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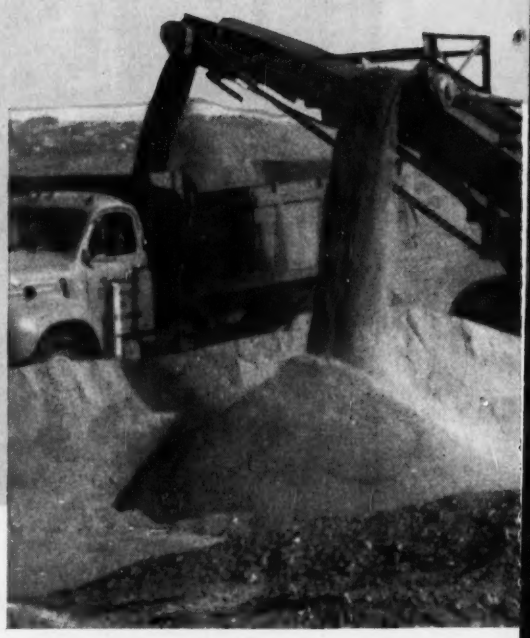
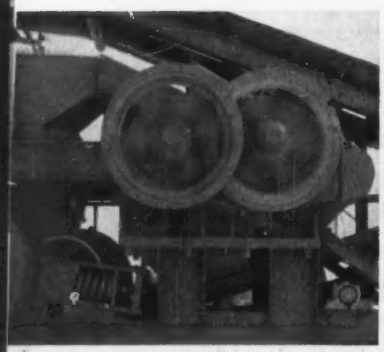


Each Component PRODUCTION-BALANCED



Twin-Jaw Crusher increases primary capacity 40% to 100%

In the two biggest-producing Cedarapids Portables—the Super Commander and the Challenger—an exclusive Twin-Jaw Crusher is used to step up primary capacity and thus increase overall plant production. The Twin-Jaw Crusher combines overhead eccentric, forced-feed design with two movable, synchronized jaws operating at high speed to provide the high velocity jaw action that crushes tremendous hourly tonnages of even the hardest materials. Jaw life 5 to 8 times longer than that on single-jaw crushers reduces maintenance.

Roll Crusher, Feeder, Conveyors, Elevating Wheel all matched to primary output

Every component in Cedarapids Portable Plants is production-balanced to permit a fast-paced flow of materials from feeder to delivery conveyor. With the Roll Crusher's large roll diameter, combined with the greater width of the rolls (the factor which controls capacity), the secondary crusher balances the output of the Twin-Jaw primary. On the Super Commander and Challenger Plants, the feeder, conveyors and elevating wheel are larger than usual to handle increased plant production.

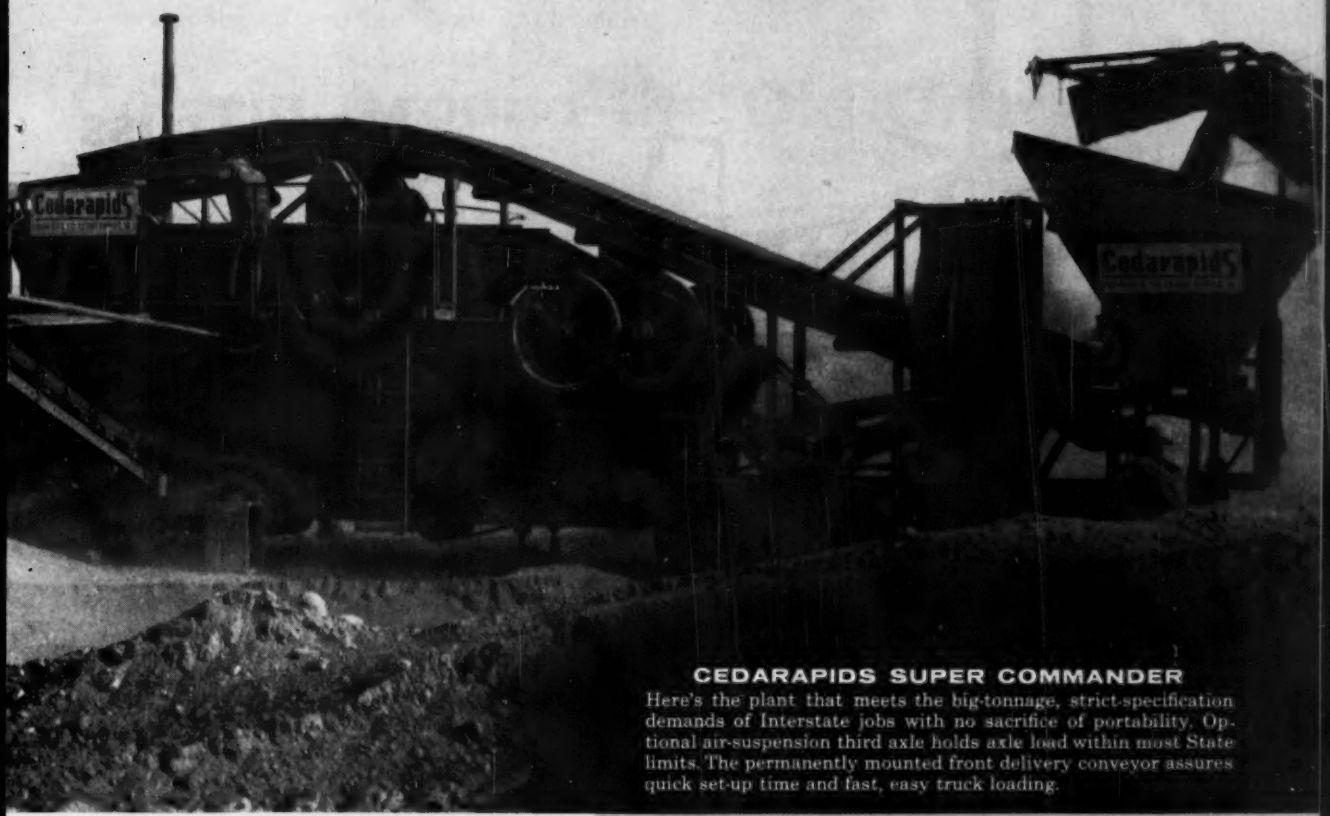
S560-N

Cedarapids Built by IOWA

CEDARAPIDS CHALLENGER

When specs call for high tonnages of 100% crushed products, this is your plant! Arranged one way, it produces three sizes of 100% crushed aggregate, plus sand and fines. When 100% crush is not required and pit material does not have excessive fines, the Challenger can be fed from front or rear to produce one to four products.

••engineered for lowest cost per ton



CEDARAPIDS SUPER COMMANDER

Here's the plant that meets the big-tonnage, strict-specification demands of Interstate jobs with no sacrifice of portability. Optional air-suspension third axle holds axle load within most State limits. The permanently mounted front delivery conveyor assures quick set-up time and fast, easy truck loading.

Horizontal Vibrating Screen easily handles highest hourly tonnages

All Cedarapids Portable Plants use horizontal screens, not only because their *horizontal* design gives up to 30% greater screening capacity and more accurate *gradation* for meeting strict *specifications*, but also because of their obvious advantages of portability. For transporting, screen position does not have to be changed.

CEDARAPIDS COMMANDER

When your volume requirements are under 300 tons per hour, the Standard Commander Plant is a high profit maker. And remember the other plants in the complete line of Cedarapids Portables —Master Tandem, Junior Tandem, Pitmaster, and Unitized Plants.

Send the coupon TODAY for full details about the complete line of Cedarapids Portable Plants

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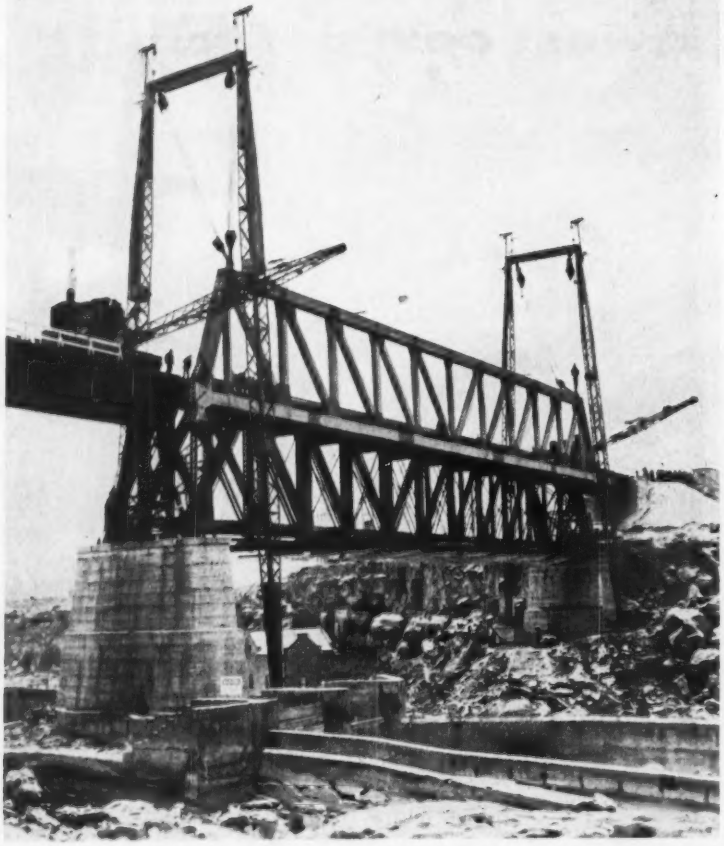


PLACING THE TRUSS—Two special lifting frames at ends of bridge pick up new truss from trucks and lower it into place on piers. Cranes help guide the truss down.

New Truss

INGENUITY on the part of both designers and erecting crews resulted in an unusual replacement of a 247-ft railway bridge over the Snake River at American Falls, Ida.

The designers arranged the panel points and main chords of the new truss so that it could sit on the same piers as the old truss at the same time. Then the field crews erected the new truss around the old one and transferred the loads from one to the other. They are now dismantling the old truss. During the entire operation—except for two 5-hr breaks—the bridge has been open to trains.

The Union Pacific Railroad is doing the job at a cost of about $500,000. The span they are replacing is a deck truss built in 1902 that has come to the end of its useful life.

Construction crews were able to replace an outdated bridge without interrupting traffic by building the new truss around the old one, then transferring the loads.

Goes in Around the Old One

The old span, with ties laid directly on the stringers, was vulnerable to fire. The new bridge will have a ballasted deck and will be impervious to fire. It will also have greater capacity. The Union Pacific is pioneering giant gas turbine locomotives and wants its bridges to be able to handle any size of locomotive they may develop in the future.

Replacing the old truss posed a number of problems. First, the bridge is part of Union Pacific's single-track main line to the Pacific Northwest, and it carries heavy traffic. It would not have been economical to detour this traffic over tracks of other companies because mileage tolls and payment to double crews would have mounted up too fast.

The height of the bridge above the river (110 ft) imposed further limitations. A shoo-fly around the bridge site would have been prohibitively expensive. And falsework, which would have required a bent for every panel point, was rejected for the same reason.

The wrap-around technique solved all these difficulties and even added a few advantages. The trains were able to use the bridge with almost no interruption. And the old truss was a convenient working platform for the erection of the new one.

One key to the success of the method was the fact that the piers are extra wide. This allowed the crews to place the new trusses outside the old ones and work the cross members through and around the old members. The designers were careful to arrange the members so that there would be no conflict between old and new.

Paxton & Vierling Steel Co. fabricated the riveted truss members in Omaha and shipped them to American Falls for field erection.

Assembly Procedure

To assemble the trusses, workmen built a 510-ft length of tangent track that consisted of four parallel rails. The two inner rails were 131-lb steel—spaced at the standard gage. They joined the main line of the railroad near the bridge.

The two outer rails were set 16 ft apart to match the distance between the old trusses. The rails ran onto the old trusses and along the top chords. These outer rails served as supports for steel outriggers attached to the new trusses to balance them as they were moved into place.

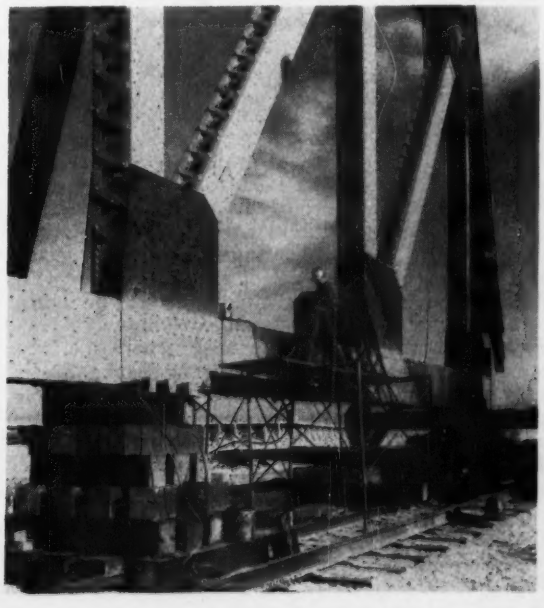
Each truss was erected in a vertical position on two trucks

Crews Assemble Truss on Siding

←**ASSEMBLY YARD**—Crew assembles truss on special siding in yard adjacent to bridge. All pieces arrived individually.

BUILDING THE TRUSS — Men complete connections on the new truss. The timber bracing and side supports were removed later.

MOVING THE TRUSS—Hoist on rail-mounted crane slowly pulls the truss onto the bridge. The outriggers and bracing keep it rigid.



FINAL POSITIONING—Lifting frames and cranes slowly move the truss onto its pier seats. Operation was tricky because tackle was not wide enough to place it alone.

NEW TRUSS GOES IN AROUND OLD ONE . . . *continued*

that looked like standard boxcar trucks but were much heavier. The Omaha shops of Union Pacific built the trucks especially for this job.

The trusses were braced extensively for their short trip from the siding to the bridge. The main bracing element was the outrigger on each truck. This consisted of a heavy horizontal beam with a vertical leg on each end. At the bottom of each leg was a sliding shoe or skid that made contact with the outer rails. A heavy diagonal brace connected each end of the horizontal beam with the top of the truss.

In addition, the top chord of the truss was guyed and stayed along its length in much the same way as a ship's mast is stayed. This helped keep the truss rigid during the move.

After the truss was assembled and braced, it was pulled slowly into position by a winch working off a locomotive crane. The crew kept the speed below 30 fpm. This phase of the operation took about 30 min.

Lifting Gear

Two lifting frames, one at each end of the span, lifted the truss from the trucks and set it on the concrete piers. Each frame consisted of a pair of 150-ft gin pole-type masts, one on each side of the bridge. They were set on reinforced concrete anchorages in the stream bed.

Between the top of the masts was a horizontal head frame to carry the lifting gear. The whole assembly was cross guyed within itself as well as to concrete anchorages beyond the end of the bridge. The gin poles and lifting assemblies were supplied by the Pacific Crane and Rigging Co. of Los Angeles under a lease agreement.

A double set of tackle was mounted on each head frame. Both sets lifted the truss vertically off the trucks until it had room to swing. Then the trucks and outriggers were moved out of the way.

One load block at each end slackened off so that the entire load was carried by the other tackle. This caused the truss to swing outward. It was then in a position to clear the old truss as it was lowered.

One further step was needed to get the truss onto its base shoes. Because the new trusses are on 26-ft centers, the tackle came 1½ ft short of swinging the truss that far out. So guide beams were set to slide out the bottom of the truss as it was lowered. When the truss reached the piers, the top was jacked plumb.

The timing of the erection procedure was very close. The crews had only 5 hr between trains. The first truss actually required a few minutes longer. But with the experience gained on the first operation, the crews placed the other truss in 4 hr and 45 min.

Cross Members

Putting in the cross members is a simple job because of the design of the new truss. Both old and new have 12 panels of identical length. But the panel points of the new truss are staggered with respect to the old points; they fall midway between them. Also, the top and bottom chords of the new truss are higher than those of the old, so the floor beams and bracing go in with no conflict.

Once the new truss is riveted in place with floor beams and bracing, the load will be transferred to it, panel by panel, by taking out the stringers of the old truss and setting in those of the new one.

The beams that carry the safety nets will perform a double duty in the transfer. When the new bridge is in place, the hangers for these beams will be transferred to the new truss. Then the beams will continue to hold the net as well as act as supports that will allow the old trusses to be disassembled without falsework.

The new truss is part of a 962-ft crossing of the Snake River. The remainder of the bridge is deck girder approach spans. They will be converted from open deck construction to a ballasted deck.

James Curran, bridge engineer for Union Pacific, is directing the operation. Frank Cogan is project engineer for Pacific Crane and Rigging Co.

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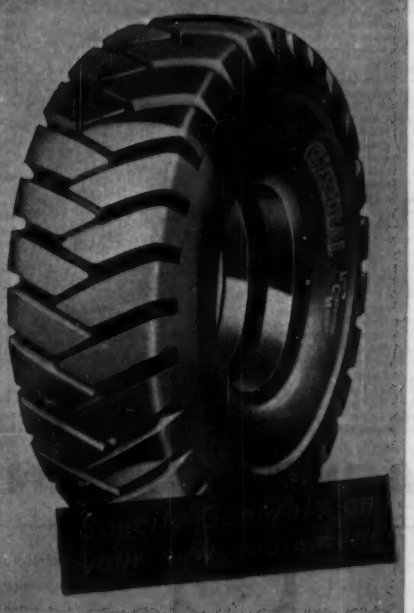

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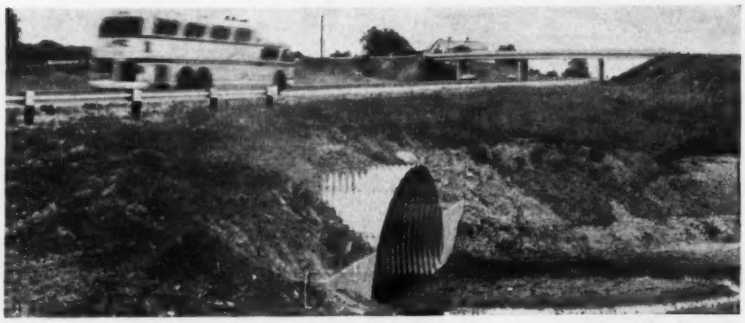
For information on these highway drainage products, just write Armco Drainage & Metal Products, Inc., 4310 Curtis Street, Middletown, Ohio.



ALABAMA
Interstate 20 (Birmingham to Pell City)
Interstate 59 (Fort Payne to Georgia State Line)
Interstate 65 (Atmore to Evergreen)

ARKANSAS
Interstate 40
Interstate 55

CALIFORNIA
Golden State Freeway (Los Angeles to Bakersfield)
Interstate 5 (San Francisco to Reno)
Interstate 15 (Los Angeles to Las Vegas)
Interstate 80 (San Francisco to Reno)
Nimitz Freeway (Oakland to San Jose)
San Bernardino Freeway (Los Angeles to San Bernardino)
San Diego Freeway (Los Angeles to San Diego)
U. S. 50 (Oakland to Carson City)
U. S. 101 (Los Angeles to San Francisco)

COLORADO
Denver-Boulder Turnpike
Interstate 25 (Pueblo to Denver; Denver North; Trinidad)
Interstate 70 (Idaho Springs)
Interstate 80S (Fort Morgan-Brush; Denver to Barr Lake)
Valley Highway (Denver)

CONNECTICUT
Connecticut Turnpike (Interstate 95)
Interstate 84 (New York-Conn. Line in Danbury, East to Hartford)
Interstate 91 (Hartford to Mass. Line at Longmeadow)

FLORIDA
Sunshine State Parkway

GEORGIA
Interstate 75 (Adel to Ashburn)
Interstate 85 (Fulton County)
U. S. 41 (Atlanta to Cartersville; Atlanta to Griffin)

IDAHO
Interstate 15 (Monida to Humphrey; Hamer to Roberts; Blackfoot to Pocatello)
Interstate 80N (American Falls to Pocatello; Mountain Home to Boise; Payette to Caldwell)

ILLINOIS
Congress Expressway (Interstate 90)
Edens Expressway (Interstate 94)
Illinois Toll Road
Interstate 55
Interstate 57
Interstate 80
Interstate 255 & 270
Northwest Expressway & Calumet Skyway (Interstate 94)
Tri-State Toll Road (Interstate 294)

INDIANA
Indiana Toll Road (Interstate 80 and 90)
Interstate 65
Interstate 70
Interstate 74
Interstate 465
Tri-State Highway (Interstate 94)

IOWA
Interstate 29
Interstate 35
Interstate 80 (Davenport to Council Bluffs)

KANSAS
Kansas Turnpike (Interstate 35; Interstate 70 Kansas City to Topeka)
Muncie Expressway (Interstate 70, Kansas City)
U. S. 50 (Turkey Creek)

KENTUCKY
Interstate 75 (Covington)

MAINE
Interstate 95 (Portland to Brunswick)

MASSACHUSETTS
Interstate 91 (Conn.-Mass. Line North through Longmeadow-Springfield to Vermont Line)
Interstate 93 (Boston to N. H. Line via Woburn-Andover-Methuen)
Massachusetts Turnpike (Interstate 90)

MICHIGAN
Interstate 75
Interstate 94
Interstate 96

MINNESOTA
Interstate 35 (Mission Creek to Sandstone)
Interstate 35W (Owatonna, north)
Interstate 90 (Austin to Dexter; So. Dakota Line to Beaver Creek)
Interstate 94 (Moorhead, north)
Minneapolis Freeway (Interstate 35W & 694)
St. Paul Freeway (Interstate 35E & 494)

MISSOURI
Interstate 3 (Kansas City, north)
Interstate 35

MONTANA
Interstate 15 (Cascade to Ulm)
Interstate 90 (Tarkio; Drummond; Springdale; Glendive East)
Interstate 94 (Crow Agency to Hardin)

NEBRASKA
Interstate 80 (Omaha to Lincoln)

NEVADA
Interstate 15 (Los Angeles to Las Vegas)
Interstate 80 (Sacramento to Reno)
U. S. 50

NEW HAMPSHIRE
Interstate 89 (Bow-Concord to Lebanon)
Interstate 93 (Franconia-Littleton)

NEW JERSEY
Garden State Parkway (Cape May to Spring Valley)
New Jersey Turnpike (Ridgefield Park to Deepwater)

NEW MEXICO
Interstate 10 (Lordsburg to West Arizona Line)
Interstate 25 (Las Cruces to Radium Springs; Socorro to Belen; Las Vegas, north; Glorieta, north and south)
Interstate 40 (Gallup, west; Ft. Wingate to Thoreau; Grants to San Fidel; Laguna to Correo; Albuquerque, etc.; Moriarity to Clines Corner; Guadalupe County Line to Santa Rosa)

NEW YORK
Cross Westchester Expressway (Interstate 487)
Empire Stateway (Interstate 81, Binghamton to Ogdensburg)
Heckscher State Parkway
Long Island Expressway (Interstate 78, Queens only)
New York State Northway (Interstate 87, Albany to Plattsburgh)
New York State Thruway and Extensions (Interstate 90, Pa. to Mass.; Interstate 87, Selkirk to New York City)
Palisades Interstate Parkway
Sunrise Highway (State Route 25)
Taconic State Parkway (New York City to Albany)
Throggs Neck Bridge(Interstate 78)

NORTH CAROLINA
Interstate 95 (Fayetteville to Dunn)
U. S. 1 (Sanford to Raleigh)
U. S. 29 (Greenville to Gastonia)
U. S. 70 (Salisbury to Raleigh)

NORTH DAKOTA
Interstate 29
Interstate 94

OHIO
Interstate 70 (Springfield to Englewood)
Interstate 71
Interstate 75 (Dayton to Piqua; Wapak to Findlay)
Interstate 90

OKLAHOMA
Interstate 35
Interstate 40
Interstate 44
U. S. 69

OREGON
Interstate 30 (Banfield Expressway; Columbia River Highway)
Interstate 99 (Baldock Freeway)
Sunset Highway (Portland, west)

PENNSYLVANIA
Interstate 70S (Washington to Pennsylvania Turnpike)
Interstate 83 (New Cumberland to Maryland line)
Pennsylvania Turnpike (Interstate 80S to Valley Forge)
Schuylkill Expressway (Interstate 80S)

SOUTH CAROLINA
U. S. 29 (Greenville to Gastonia)

SOUTH DAKOTA
Interstate 90 (Black Hawk to Rapid City)
Interstate 93 (Sioux Falls to Iowa State Line)
Interstate 95 (Sioux Falls Bypass)

TEXAS
Interstate 10
Interstate 20
Interstate 35
Interstate 45

UTAH
Interstate 15 (Beaver to Paragonah; Harrisburg Bench; St. George, north; Levan to Scipio)
Interstate 70 (Cat Canyon to Emery Gy Line)
Interstate 80 (W. Tremonton to Bl. Creek; Henefer to Echo, Parley's Canyon)
U. S. 40 (Heber to Silver Creek Junction)
U. S. 89 (Mt. Pleasant to Manti; Hatch, south; Kanab to Glen Canyon)
U. S. 160 (Moab, north)

VERMONT
Interstate 91 (Mass. Vt. Line North through Guilford-Brattleboro-Dummerston-Putney)
Interstate (White River Jt. to Montpelier-Burlington-St. Albans)

WASHINGTON
Interstate 10 (Renton and Shore Cutoff; Seattle-Spokane-Coeur d'Alene)
Interstate 99 (Olympia Bypass; Vancouver to Olympia; Tacoma-Everett Freeway; Vancouver Bypass; Auburn-Echo Lake Bypass)

WEST VIRGINIA
Interstate 64
Interstate 77

WISCONSIN
Janesville Bypass
Interstate 90
Interstate 94
Interstate 894 (Bypass around Milwaukee)
Milwaukee County Expressway

WYOMING
Interstate 25 (Cheyenne to Casper)
Interstate 80 (Rawlings to Evanston)
Interstate 90 (Buffalo to Newcastle)

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company • The Armco International Corporation • Union Wire Rope Corporation

Unloading Trucks

Delivering Mortar

Erecting Scaffolds

The masonry subcontractor on this big housing project has four fork lift trucks that boost the efficiency of his crews.

Fork Lifts Lend Masons a Hand

MECHANIZATION and thorough job planning make it possible for 36 masons to lay bricks for the walls of five 40x100-ft houses per day in a 425-unit housing development at Fort Campbell, Ky.

Contractor W. R. Whaley of Knoxville, Tenn., has on hand four Case M-420 fork lift trucks to back up the masons all along the line. One fork lift loads trucks with pallets of brick and split stone at the railroad siding. Another unloads the trucks at the site and spots the pallets around each building within easy reach of the masons. When the walls are about half way up, a third fork lift erects steel scaffolding to support workmen while they complete the wall.

Whaley even figures out how many odd-cut bricks will be needed and loads a farm wagon with the correct number of each size for each building.

When one of Whaley's crews starts on a building the floor slab has been poured, all utilities are in, the frame has been put up, and the roof is on. Special crews lay the two starting courses of brick so that subsequent courses will come out as planned.

Then one of four masonry crews starts laying brick in the bottom 4 ft of the wall. Each crew is composed of nine masons and two or three helpers. Each mason is assigned a specific section of the wall, and he works the same section on each of the houses his crew handles. This specialization increases efficiency and boosts quality.

How They Save Time

Whaley intentionally overstocks each building with pallets of brick and stone. It's cheaper and quicker to remove the excess with one of the fork lifts than to have the masons wasting time scrambling for out-of-reach pallets.

An electric breaker supplies odd cut bricks. They're cut well in advance and stocked at each building site in a farm wagon.

When a crew has built the wall of a building about half way, or 4 ft or so above the ground, it moves ahead to start the bottom half of another building. Meanwhile a Case M-420 with forks lengthened to 60 in. erects 4-ft-high, 7-ft, 8-in. by 5-ft, 5-in. preassembled sections of Waco steel scaffolding around the building the masons have just left. An 8x8-in. timber laid across the heel of the forks keeps the scaffolding from rubbing against the front wheels of the fork lift .

When the scaffolding is in place and stocked with pallets of brick the masonry crew returns to complete the upper portion of the wall. The fork lift and a crew of two or three men can set up scaffolding for a building and stock it with pallets of brick in 45 min.

When the walls of a building are completed, a fork lift moves the pallets to another building. Pallets are not restocked until empty.

The fourth Case M-420 fork lift is available mainly to back up the other three. Every week or so its forks are replaced by a loader bucket and it handles cleanup around the work area.

The assembly line building method realizes substantial savings in man-hours. Some crews with a total of 36 masons might have an equal number of helpers. Whaley gets by with an average of only 10 helpers.

Better products, *faster*, from your National Seal specialist:

Tough jobs need the better protection of National Oil Seals with exclusive Micro-Torc

Exclusive "Micro-Torc" process makes leather seal better and last longer on toughest jobs

National's exclusive Micro-Torc Oil Seals are scientifically impregnated part way through the leather. This coated side seals in the lubricant . . . shuts out dirt, grit and water. The natural uncoated side remains porous to absorb needed lubricant to keep the leather pliable and sealing properly.

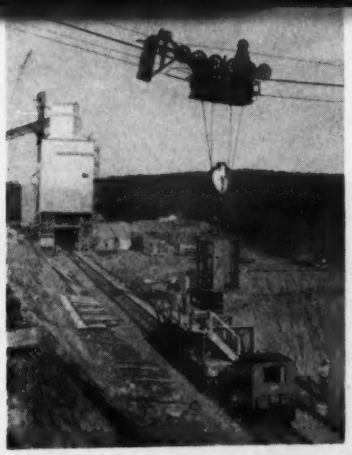
Whether your equipment calls for Micro-Torc leather, or National's Syntech synthetics, you can place full reliance on these better built seals in affording the kind of protection so important in holding equipment maintenance costs at a minimum.

You'll find your National Seal specialist can give you off-the-shelf delivery on the most complete line of seals in the industry. He's always nearby.

NATIONAL OIL SEALS

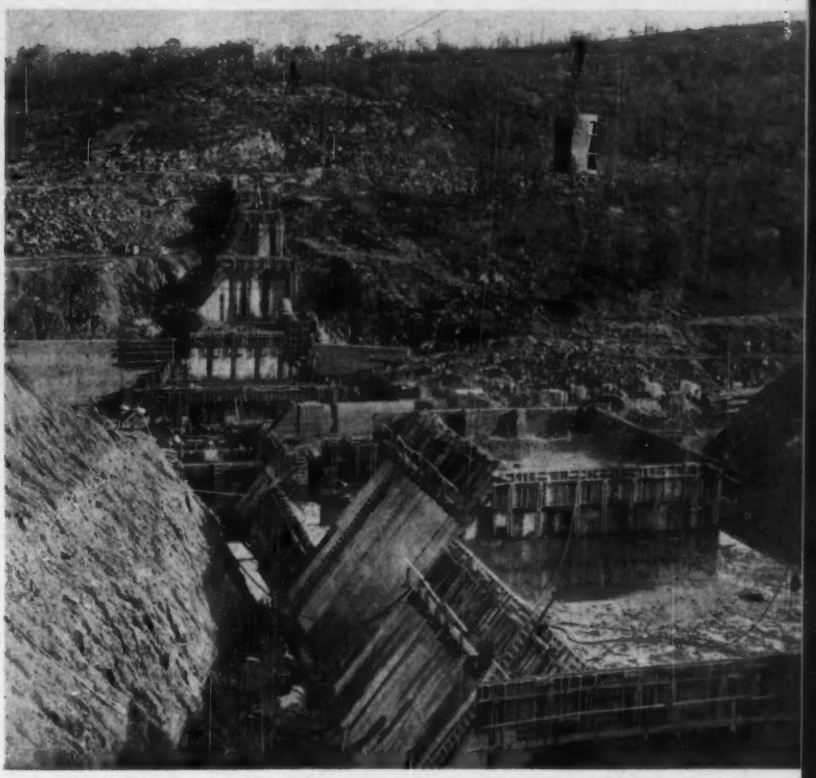
FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN



PICK-UP—Cableway picks up full 4-yd bucket from the flat car. Locomotive will haul the empty bucket back to the concrete plant while the full bucket is being dumped.

Contractor Invests In Diversification



DELIVERY—Concrete bucket travels at speed of 1,200 ft per min along the cableway to the pour area. Capacity of cableway is 80 yd per hour. Cycle time is 3 min.

It was really tough to get enough work to keep their equipment busy, so this outfit bid and won their first mass concrete dam job and spent $1 million for the plant to build it.

COMPETITION can force a contractor to take on a type of work his men have never handled before. That's why Berlanti Construction Co. of Harrison, N. Y., is building their first mass concrete dam after years of roadbuilding, earthmoving, and other work. They've had some experience building earth dams, but this big concrete job is a definite break with the past.

Berlanti has about $5 million of equipment, and they figure they need at least $20 million in contracts a year to make this investment pay. They weren't getting enough jobs to keep their equipment busy last year so they decided to bid on Charlottesburg Dam at Newfoundland, N. J. Their $4.8-million bid won the job.

The dam is a 700-ft-long concrete structure made up of 14 sections, each 50 ft long. Lifts are 5 ft. The dam is roughly triangular in shape, tapering from a width of about 81 ft at the base to 15 ft at the crest. Height of the vertical upstream face at the center of the narrow valley is about 100 ft. A 200-ft-long spillway, topped by a 5-ft-high steel gate, will carry the overflow over the crest.

They Bet a Million

Berlanti bought $1 million of new equipment for the job. Their concrete plant formerly supplied concrete for the Eisenhower Locks on the St. Lawrence Seaway. At that time the fully automatic Johnson plant housed three 4-yd mixers with a capacity of 250 yd per hour. Now with only two mixers it's capacity is about 180 yd per hour.

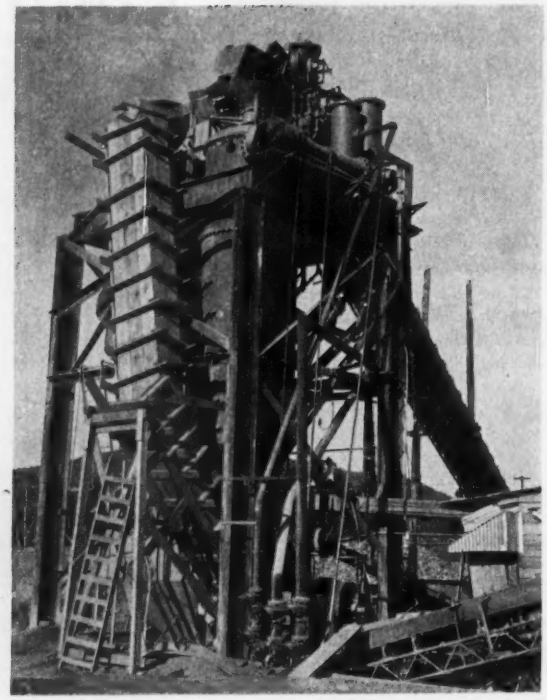
But Berlanti can't operate the plant at capacity because the dam is chopped into many small pours. A typical section takes about 500 yd. At most they can pour two sections a day; specs require a five-day wait between superimposed lifts. So they average about 1,000 yd or less per day—well below the capacity of the plant.

They realized when they bought the plant that it was bigger than they needed for this job. But with only two of the original three mixers it's not too much bigger than necessary because if one mixer breaks down the other is able to keep a pour going.

The tower-suspended cableway that places concrete was bought to fit the job. It's peak placement rate is about 80 yd per hour. They average a steady 65 yd per hour. It's slow work, but it's the only way to do it.

continued on next page

CONCRETE—The fully automatic Johnson plant houses two 4-yd mixers with a capacity of 180 yph—bigger than needed for the job.



AGGREGATE—in summer a Croll-Reynolds vacuum plant cools aggregate to 60 deg. In winter Berlanti heats the mixing water.

A Croll-Reynolds vacuum cooling plant supplies aggregate to the plant at a rate of 60 tons per hour. That's just enough to produce about 80 yd of concrete per hour, the peak placement rate of the cableway. The plant cools aggregate to below 60 deg in warm weather. During cold spells Berlanti shuts down the cooling plant and turns to heating the mixing water to maintain a batch temperature of at least 45 deg.

A 30-in. conveyor transports the aggregate from the cooling plant to the bins of the concrete plant. Four 5,000-lb bins hold aggregate ranging in size from ¾-in. up to 6 in. Bulk cement is delivered to the site by rail and an airlift shoots it to a 5,000-bbl silo that feeds a 3,000-lb bin.

Fly ash added to the mix cuts down the heat created by cement hydration and also reduces the cost of concrete without sacrificing too much strength. It makes up 30% by volume of the cement. The fly ash is brought to the site in rail cars and stored in a 110,000-lb silo.

After mixing, the concrete chutes into one of two 4-yd air-operated Gar-Bro buckets on a flat car beneath the mixers. A 10-ton Caterpillar diesel locomotive hauls the flat car along a shuttle track to the cableway stretching across the valley. The flat car delivers a full bucket while the cableway is dumping the other bucket. It takes only a minute to travel the 200 ft between plant and cableway.

Cableway

The Ledgerwood cableway is fitted with a Sauerman carriage that carries the bucket on a four-part line. The 75-ft-high head tower moves on two sets of standard-gage tracks 27 ft, 3 in. apart. Length of the head tower tracks is about 500 ft.

The 35-ft-high tail tower is fixed. It's set into a rocky outcropping on top of the hill on the opposite side of the valley. The 2½-in. main cables span 1,200 ft across the valley.

A 300-hp electric power plant drives the conveying and hoisting drums. Capacity of the cableway is about 20 tons; maximum live load is 15 tons. Top conveying speed is 1,200 ft per min. The bucket moves vertically at a top hoisting speed of 300 ft per min.

So far the cableway has averaged about 65 yd per hour in placing almost half the 100,000 yd of concrete that the dam will require. Biggest single-day pour was 1,100 yd.

Forms for the 5-ft lifts are 5x 10-ft cantilever panels braced by two steel strongbacks 6 ft apart. F. B. Bailey, a Newark, N. J., consulting engineer, designed the forms.

A she-bolt connected to a tie embedded in the concrete of the previous lift anchors each strongback. A foot block at the bottom transmits the thrust of the cantilever to the concrete in place below. At the top of the strongback an adjusting screw aligns the panels.

At the Start

Berlanti opened up the job a year ago, bringing in two 2½-yd Northwest 80-D shovels to start excavation. The shovels loaded a truck and scraper fleet consisting of six Mack rear dumps and eight Caterpillar DW20's. Two Caterpillar D8's and two Allis-Chalmers HD-20's handled rough grading and cleaning up.

continued on page 146

Presenting the NEW LE ROI 75 ROTARY

with fingertip starting — automatic speed-pressure control—easy one-man handling—and modern chassis with flip-top hood!

STARTS FAST with push-button ease. Conveniently grouped controls simplify operation.

(Right) **TRIM BUT ROOMY** enclosure protects engine and compressor unit—provides ample space for carrying and safeguarding tools.

The new Le Roi 75 Rotary is as close as you can get to carefree on-the-job air power. It's slimmed down to its working best — to give a profitable account of itself on small heavy-duty jobs that call for 75 cfm of air at 100 psi.

This bantam rotary is trim, light, and compact for easy handling and for efficient, low-cost operation. You can tow it anywhere with truck or auto. And it's so perfectly balanced that one man can move it around the site quickly and easily — tools and all!

here's dependable air power with a flip-top hood.

FLIP-TOP HOOD opens all the way for fast, unobstructed adjustments or servicing.

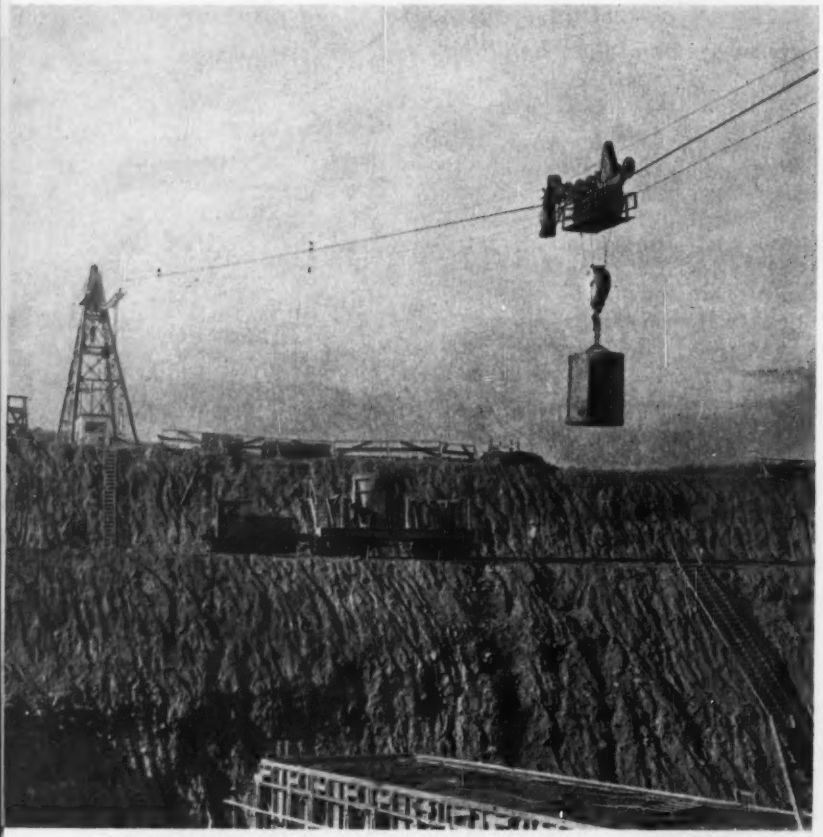
Spring the modern aluminum flip-top hood if you want to see the latest in space- and parts-saving design! The single-stage rotary is direct-coupled to a 4-cylinder, water-cooled engine. You get such top-performance and long-life features as automatic speed-pressure regulation and oil-temperature control — 12-volt electric starting — separate engine and compressor cooling systems — generous ventilation — and better, easier access to all parts than ever before possible on *any* portable air compressor!

Why waste larger units and extra men on small jobs — when you can do the job better, faster, and at lower cost with the new Le Roi 75 Rotary? See it — get it today from your nearby Le Roi distributor. Or write Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wisconsin.

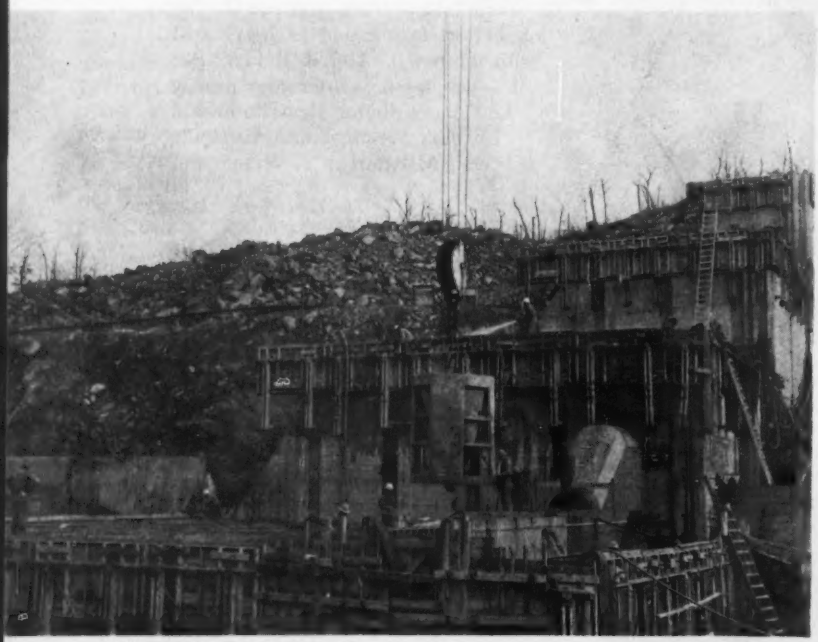
LE ROI ROTARY COMPRESSORS

PORTABLE AND TRACTAIR® AIR COMPRESSORS
STATIONARY AIR COMPRESSORS
AIR TOOLS

PS-984



ON THE WAY—Cableway places about 65 yd per hour on the average. Head tower moves back and forth along double row of tracks to spot bucket directly over the pour area.



INTO PLACE—Air-operated Gar-Bro bucket dumps concrete into 50-ft-long dam section formed with 5x10-ft cantilever panels braced by two strongbacks spaced 6 ft apart.

Production averaged about 1,600 yd per day. A substantial part of the excavated material was stockpiled nearby for later use as backfill around the dam abutments.

About 60,000 yd of the total 160,000 yd of excavation on the job was rock. Four Gardner-Denver Air-Tracs drilled 3-in. holes on 3-ft centers. Average depth of cut into rock was about 12 ft. In some places holes went as deep as 20 ft because of extensive decomposition in the upper levels of the rock. To prevent overbreak, powder crews placed six delays at evenly spaced intervals in each hole.

Two Ingersoll-Rand 500-cfm compressors, an Ingersoll-Rand 600, and two Worthington 500-cfm compressors supplied air to the drills. A 6-in. steel pipe air line connected the units.

Most of the rock blasted out to seat the base of the dam was a hard trap rock, ideally suited for concrete aggregate. And there was plenty of it. Berlanti considered setting up a plant to supply aggregate for the dam, but it would have meant tying up about $150,000 in equipment. So they shopped around and made a deal with a commercial plant at a price just about equal to the cost of supplying themselves.

The End's in Sight

After a short lay off during the winter, Berlanti plans to start operations again by the end of next month, if weather permits. The job will be completed this summer.

Backing up the Pequannock River, the dam will create a 2,900,000,000-gal water supply reservoir for the city of Newark. The reservoir will cover about 360 acres.

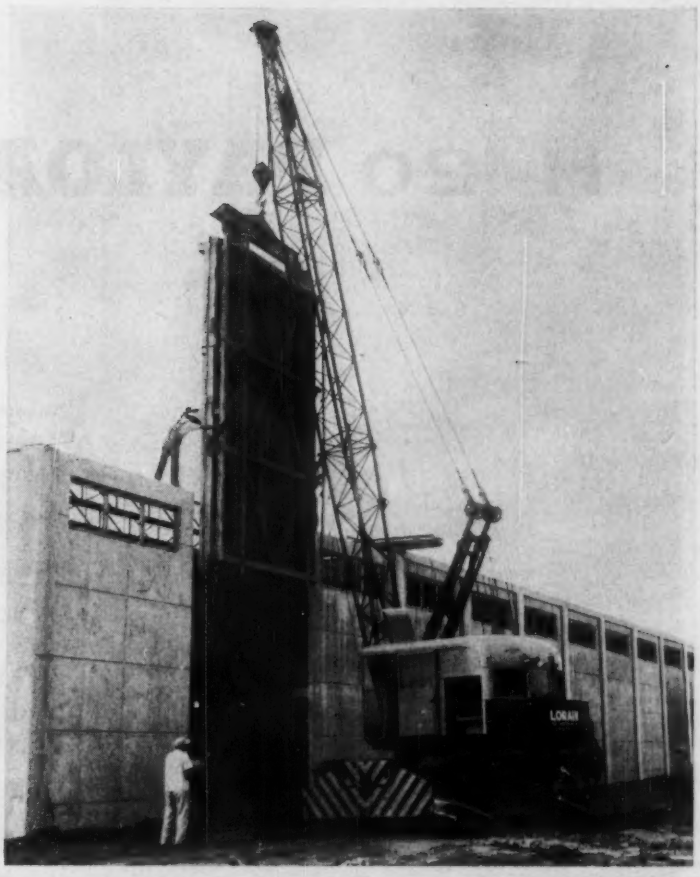
Men on the Job

Project Manager for Berlanti is Arden Morgan. Superintendent is Gene Berlanti. Parsons, Brinckerhoff, Hall & MacDonald, New York, are engineers on the $4.8-million project. Herb Kaufman is project engineer; Joe Goldbloom, resident engineer.

Supervising construction for the Division of Water Supply of the City of Newark is Division Engineer A. J. Simpson. Jim Garrat is his assistant.

"Tilt-Frame" method used to erect 14 buildings. In a patented process, developed by Garmon Construction Company of Fort Worth, reinforced concrete wall sections are poured into steel frames and put in place less than 24 hours after pouring, cure on the job. Fast, "Power-Set" Outriggers team up perfectly with this fast construction procedure.

Moto-Crane moves up fast as building grows. "Power-Set" Outriggers are partially retracted for ground clearance in 20 seconds. The Moto-Crane moves along for the next lift, and the outriggers are set in another 20 seconds. Maximum capacity and stability for every lift . . . no lost time.



MOTO-CRANE SETS OUTRIGGERS IN 56 SECONDS TO ERECT CONCRETE WALL SECTIONS

"Power-Set"* Outriggers—Lorain's pace-setting development—speed building at Richland Industrial Park in Fort Worth, Texas.

When Gorbett Brothers of Fort Worth, owner of five Lorains, moves in with a 35-ton Lorain Moto-Crane MC-530W to erect reinforced concrete wall sections, the operator can position the "Power-Set" Outriggers in less than a minute. During an 8-hour day this Moto-Crane handles 16 twenty-ton panels. This means many moves a day with a new outrigger set-up each time . . . but it is a breeze with Lorain "Power-Set" Outriggers.

Quick leveling in tight quarters—Each outrigger is independently controlled . . . adjusts to proper spread for working alongside walls. Each adjusts automatically to sloping or uneven ground. Machine is always level.

Positive security with wedge locks—After the four independently controlled and hydraulically powered curved beams move into position, wedge locks automatically take over. No hydraulic pressure is needed to hold outrigger beams in the extended working position.

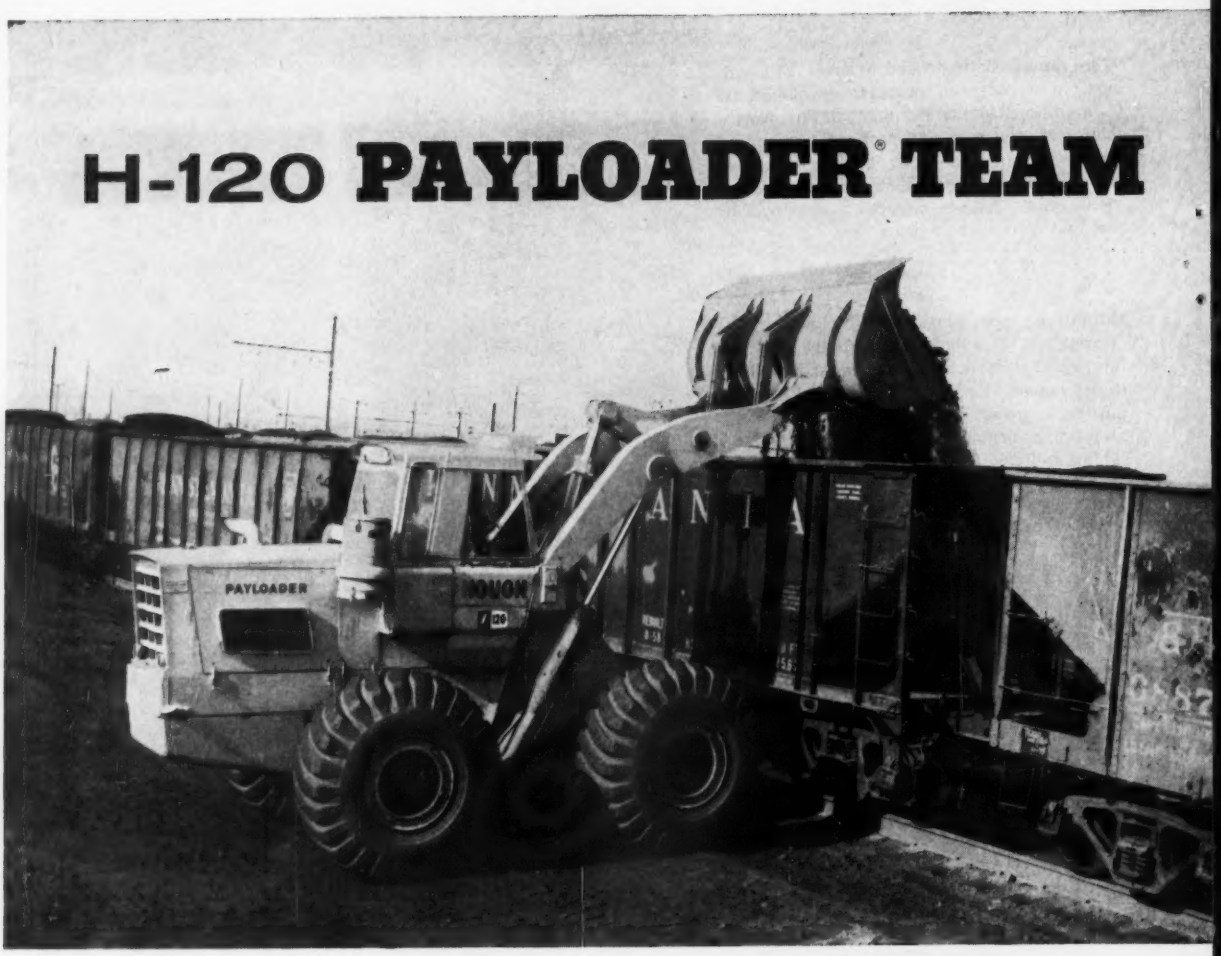
A Lorain Moto-Crane is the fastest way to get *to* the job. Lorain "Power-Set" Outriggers provide the fastest way to move around *on* the job. See your Lorain distributor today, or write direct for a booklet. *Patented

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE

PLANTS in Lorain, Elyria and Bucyrus, Ohio . . . **PRODUCTS**—Power shovels, cranes, draglines, clamshells, and hoes on crawler mountings from ⅜- to 2½-yard capacity. Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes. Rubber tire front-end Moto-Loaders in 1¾- and 2-yard models . . . **OUTLETS**—Lorain products sold and serviced by 249 distributor outlets throughout the world.

H-120 PAYLOADER® TEAM



4 Huge Model H-120 "PAYLOADER" Units Were Selected For The Job

"The better balance, speed and maneuverability of the H-120 makes it a better buy than larger competitive models tested on this job," says Charles E. Young, Job Superintendent.

SPEEDS ORE-HANDLING OPERATION

for Armour Excavating, Inc.

Armour Excavating, Inc. is one of the contractors that has expanded its operations into the ore-handling field. Its share of such work has increased with the rapid growth of the Port of Philadelphia as an important iron ore handling center.

The Pennsylvania Tidewater Dock Co., at Pier 122 South, has a 4-crane ore dock capable of unloading 6,000 tons of ore an hour, which the Pennsylvania Railroad transports in cars to a number of steel mills in this part of the country. They have areas available for the ground storage of between 3 and 4 million tons of ore, the ground having been previously prepared by Armour.

One phase of Armour's ore-handling work consists of loading railroad cars with the various types of ore which have been stockpiled along miles of track. This work has been greatly expedited by the recent purchase of 4 Model H-120 "PAYLOADER" units from M-W EQUIPMENT CO., Division of Metalweld, Inc.

These "PAYLOADER" units pick up the ore from the stockpile, carry it to the track and load it directly into railroad cars. Their speed and mobility enable them to travel over this site in a few minutes. In addition, they move loaded cars along the track and bring in empty cars to be loaded. No other equipment is needed for this entire operation.

Joseph Keenan, an operator, says, "I like the H-120 better than anything I've run. It's faster, comfortable and easy to handle. The balance is perfect and the safety and visibility is tops, because of the lift arm design. The high lift and long reach let me center the loads in the gondolas as the railroad demands with this heavy ore."

The Model H-120, conservatively rated at 12,000 lbs. operating capacity, is the largest of the "PAYLOADER" line of 20 models in 8 capacity ranges. Your Hough Distributor with his complete parts and service facilities, backed by Hough field service personnel, invites your inquiry. See him today.

The "PAYLOADER" units need no 'dozer or other assistance in the loading operations, because they also do their own towing and car spotting, dozing, stockpile trimming and clean-up work.

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THE FRANK G. HOUGH CO.
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THE FRANK G. HOUGH CO.
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☐ Send data on Model H-120 "PAYLOADER"
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Designed for today's concrete placement techniques

Uni-Form Panels have changed over the years to keep pace with modern concrete forming practice.

Today's Uni-Form Panels weigh a little more (about ½ lb. per foot) than other pre-fab form panels because *they are designed and built to meet today's requirements.*

We know that if the assembled concrete form is to have the structural rigidity necessary to withstand today's concrete placement techniques and high rates of pour, the individual panels which make up the form must have great inherent strength.

We produce the strongest form panel we know how to build. The great strength—and extra weight—of Uni-Form Panels is due almost entirely to the special "T" section steel frame which supports the struts or load bearing members of the panel.

Most specification concrete does not permit deflection in the forms. If the form panel does not have the strength to take the stresses imposed by normal concrete construction practices, it is a liability that can cause serious problems.

Uni-Form Panels are designed to take the full strength of the tie, plus a wide safety factor to avoid any possible deflection or permanent set in the load bearing member. Concrete formed with Uni-Form Panels will be straight and true.

Because they are so strong, you don't have to "baby" Uni-Form Panels. *You don't have to make major changes in your method of handling and placing concrete.* You can apply the heaviest practical pressures and highest pouring rates to a Uni-Formed concrete form with assurance that it will stand up and take it.

When you rent or buy any pre-fab form, it will pay you to consider carefully what you're getting. If you want a panel that is built to give you maximum forming speed, economy, efficiency, and service life—look to Uni-Forms. More contractors are using them every day because Uni-Forms deliver where it counts . . . on the job.

Write for the UNI-FORM Panel Catalog. It contains complete details on the industry's most modern and flexible concrete forming system.

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In any piece of equipment there are vitally important components and engineering developments not apparent to the eye. Only after years of hard and strenuous use, does their strength or weakness become apparent . . . and inscribe itself on your profit and loss statement!

One of the important features of the modern Eimco line of crawler-tractors is the broad use of heat treated alloy steels, for greater strength and resistance to metal fatigue. Instead of using cheaper iron castings, Eimco produces highest quality, carefully controlled steel in its own electric furnaces, under highly skilled metallurgists.

In an Eimco, the track shoes, sprockets, idlers, track rollers and equalizer bars are all produced in Eimco's vast and modern plants from heat-treated cast alloy steels, and other components from special steels, tailor-made by Eimco for their particular end-uses. One of the results has been a record of over seventy per cent savings on maintenance and parts costs by Eimco operators, as against the average for any other leading make of crawler-tractors!

You can easily see many of the Eimco exclusives, such as Up-front Operator Position; "Uni-drive" transmission at work, for flip-of-the-lever shifting, forward or reverse; Dual Final Drives for maximum maneuverability and true spin turns and others.

But remember, under these unique and important features, is the heart . . . the guts . . . of any tractor. The integrity, quality and craftsmanship of the manufacturer. Eimcos are built to a standard that permits a full year guarantee on the entire tractor and transmission.

So step up your work output . . . and profit . . . with the modern and efficient line of crawler-tractors . . .

Eimco 103 100 HP

Eimco 105 143 HP

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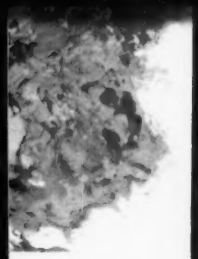


Shown above, is the Eimco 103 Dozer, one of the great machines in this Eimco 100 HP series of crawler-tractors. Available as a basic Tractor, in twelve models of Dozers, as Model 123 Front End Loader and the Eimco 133 Special Steel Mill FEL and the 143 Log Loader.

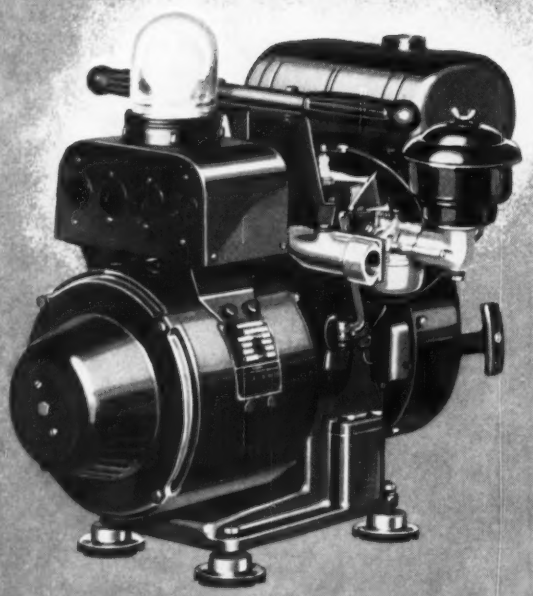
Eimcos can take it! Every major steel mill has found that Eimco Loaders, such as the Eimco 115 Excavator shown here, will outproduce, outload and outlast any other loader . . . will keep producing and performing, with minimum maintenance, year after year. The famous 105 series is powered by 143 HP GMC Detroit Diesel or 130 H.P. Cummins Diesel engine of latest, modern design. Available as Tractor, Dozers, Excavators, Special Mill Excavators and Front End Loaders.

Get all the facts! Contact the Eimco Dealer or Branch nearest you, or write The Eimco Corporation, P. O. Box 300, Salt Lake City 10, Utah, U.S.A.

Powered by the newest V-6 diesel engine, the 106 series features the most practical Front End Loader and Log Loader offered today. Combining maneuverability and speed with the power of 205 HP, the Eimco 106 series is available as a Tractor, all types of Bulldozers, Front End Loader (Model 126), Special Steel Mill FEL (Model 136) and, as pictured, Model 146 Log Loader with all Forestry Department approved attachments.

POWER with a reputation for rugged reliability

KOHLER ELECTRIC PLANTS



MODEL 1.5M25, 1500 watts.
Powered by a Kohler engine.
Sizes to 100 KW gasoline or diesel

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4-CYCLE • SHORT STROKE • AIR-COOLED

MODEL K161
Sizes from 4 to 24 H.P.

Since 1920, Kohler electric plants, powered by Kohler engines, have provided a host of users with reliable, efficient electric power for sole supply, automatic stand-by and marine needs.

Also powered by Kohler engines are many kinds of equipment, produced by numerous leading companies, for use in construction, agriculture and industry.

With long experience in the production of internal combustion engines and electrical generating sets, Kohler Co. emphasizes ruggedness, conservative rating, ease of maintenance, ease of starting. Sales and service nation-wide. Write for illustrated printed matter.

KOHLER CO. Established 1873 KOHLER, WIS.

KOHLER OF KOHLER

Enameled Iron and Vitreous China Plumbing Fixtures • Brass Fittings • Electric Plants • Air-cooled Engines • Precision Controls

Teams Pour a Floor a Day On Six 20-Story Buildings

For this contractor, success on a big building project comes from smart application of a number of small but time-saving tricks learned from experience.

TALL CRANE—P&H crawler crane, one of three long-boom cranes on the job, helps a reinforcing crew place steel on 20th floor. Two of the end wall forms are in place.

CONCRETE CREWS are putting up New York City's Manhattanville Houses (the city's newest public housing development) at the rate of a floor a day. That includes erecting formwork for columns and floors as well as pouring 330 cu yd of concrete for each floor.

It's good production. If you look around the job to see how they do it, you won't find any sensational new methods. But you will spot a lot of little things, like clean work areas, time-saving safety measures, and forming tricks that cut minutes from every phase of the pouring schedule. It's a professional-looking job by a pair of contractors with a lot of experience in this sort of multiple-building project.

The contractors are the George F. Driscoll Co. and Moccia Construction Corp., both of New York City. They have a $11.8-million joint venture contract with the New York City Housing Authority to build the Manhattanville Houses. The project contains six Y-shaped buildings, each 20 stories high plus towers and penthouses.

Foundation Pours

The concrete work presented some problems right from the start. Because of varying ground conditions, the concrete foundations for the six buildings were of different types. The most unusual was the mat foundation for the first building.

That foundation consisted of a single concrete slab under the whole building. The contractors poured it in one continuous 10-hr pour. It was the largest monolithic slab of concrete ever poured from transit mixers in New York City.

Total concrete involved was 2,700 cu yd. Average thickness of the slab was 5 ft. The building is Y-shaped with one short 50x74-ft leg and two equal 51x115-ft legs.

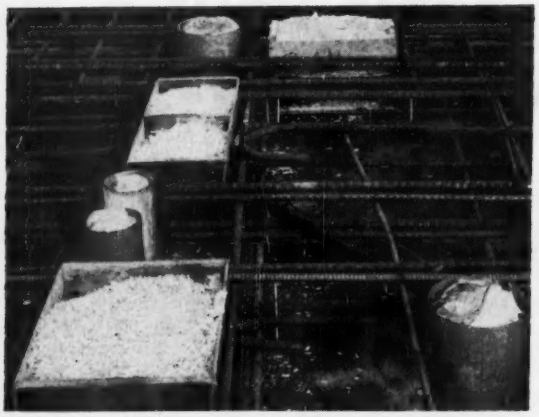
The contractors set up the pouring schedule on a Saturday for two reasons. First, they were assured of the full production from two plants of the Ryan Ready-Mixed Concrete Corp., from whom they were buying the concrete. Second, there was less traffic on the streets and the forty-five 11-yd transit mix trucks on this assignment made much better time. These advantages of Saturday work outweighed the cost of paying double time to the crews.

Once the pour started it had to keep going. As a precaution against a breakdown of one of the plants, the contractors arranged to have a third plant fully manned on a standby basis. They actually never had to use it, but it was good insurance.

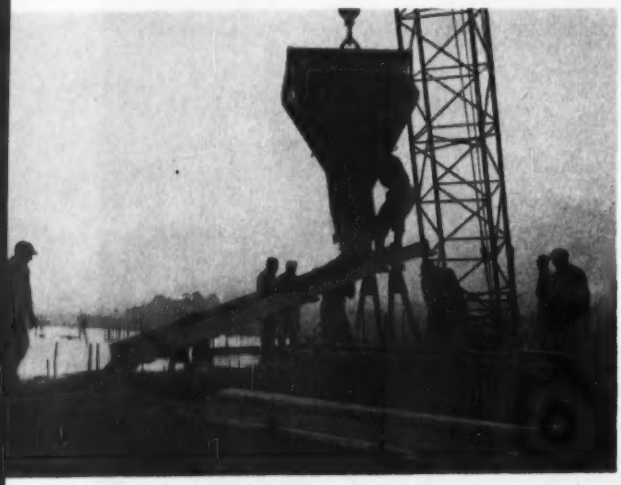
At the site, the trucks dumped concrete into 11 chutes spaced around the outside of the slab. In the center part of the slab, beyond the range of the chutes, two cranes with 2-yd buckets placed the concrete. Average rate of pour was 300 yd per hr.

Pouring the slab wasn't the only problem with that particular foundation. The engineers had specified that the slab had to rest on undisturbed ground. To achieve this, the contractors ex-

FORMWORK—Re-usable plywood column and slab forms are ready for continuous pour. The shoring will remain in place 21 days.



DUCT OPENINGS—Concrete is poured right over these sawdust-filled duct forms. The result is a safe, unbroken floor surface.



CHUTING THE CONCRETE—Portable wood chute carries concrete across building. The crane cannot reach across the upper floors.

DIRECT POURING—On near side of building, crew places concrete from crane's bucket. Bucket can handle 3¼ yd of concrete.

cavated to within 1 ft of grade with normal heavy excavating equipment. They cut out the next 6 in. with a bulldozer. A crew of men removed the final 6 in. with hand shovels.

Pouring the Floors

To maintain the floor a day schedule, crews and equipment move from building to building in regular sequence. While the concrete crew is handling the pour on one building, a steel reinforcing crew is getting the next ready, and another crew is setting up forms on a third building.

The maximum rate of pouring was eight floors in one week. This was while the buildings were low and the crane did not have far to hoist the concrete buckets. Now, with the buildings over 20 stories high, the crews and machines work full time to complete five floors a week. On any individual building, a floor is added every eighth or ninth day.

Three cranes have specialized roles in the work schedule. They move from building to building just like the crews. A 955 P&H crawler crane works full time on steel reinforcing. A second P&H crawler strips forms in the morning and handles miscellaneous chores in the afternoon.

The third crane, a Lima 1250, handles the concrete bucket. The contractor and manufacturer worked together to develop the boom and jib arrangement to provide maximum working height. They ended up with a 225-ft tubular steel boom with a 30-ft jib. This is sufficient to lift an 8-ton load to the 25th floor of the buildings (there are only 20 full floors, but tower and penthouses on the roof increase the height of one building to the equivalent of 25 floors).

Operating a crane at this height requires an unusually skilled operator. All normal safety precautions for cranes are doubly important for a crane this size because the operating margin of error is less than it is for shorter boom cranes. For instance, it is essential to have the crane sitting on perfectly level ground. A bulldozer, guided by a man with an engineers level, prepares a flat piece of ground at each of the buildings. When the Lima arrives at a building, it centers itself on the level area.

The boom has to be kept strict-

FRUEHAUF TANKS FOR BULK HAULING JOBS

E. Brooke Matlack, Inc., of Philadelphia, recently purchased 150 of these Fruehauf Airslide* Pressure Tanks to haul bulk cement on construction jobs in Pennsylvania.

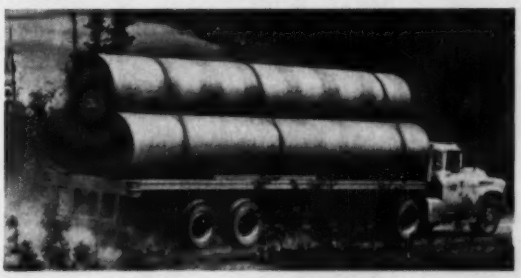
*"Airslide"—Trademark, Fuller Company

FRUEHAUF TRAILERS WORK PROFITABLY!

Steel, aluminum, and stainless steel Fruehauf tanks are designed and built to out-last and out-earn all others. The new Fruehauf Airslide* Pressure Tank, for instance, is capable of unloading up to 115 barrels of aerated cement, barites, or powdered chemicals in only 30 minutes, pumping them as high as 80 feet. Such time savings are *profitable.*

Automatically welded Fruehaufs are the longest-lasting, safest, most leak-free vessels in the business. Dollar for dollar, their specifications exceed all others for quality and value. And there is a Fruehauf hoist, cable, or hopper type dump, or a Fruehauf platform or carryall, for profitable duty on every type of construction and roadbuilding job.

FRUEHAUF DUMPS FOR GRAVEL HAULING JOBS



FRUEHAUF PLATFORMS FOR MATERIALS HANDLING JOBS

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TEAMS POUR A FLOOR A DAY . . . *continued*

ly within the angles specified for each load. The operator found that the rough angle indicator that the manufacturer mounted on the boom was not accurate enough to satisfy him. So he built his own gage by fastening a wire to the cab, running it over a pulley on the boom, and letting it hang down with a weight on the end. The weight moves up and down, with a pointer attached, along a yardstick as the angle of the boom changes. It is a simple device, but it gives an accurate measurement of the boom angle.

Concrete arrives on the site in 11-yd transit mix trucks and is dumped into a Gar Bro 3¼-yd bucket handled by the crane. This bucket, if slightly overloaded, can empty the 11-yd truck in three loads.

On the higher floors, the crane cannot reach across to the far side of the building so it dumps concrete into a portable, sloping wood chute that carries the concrete across the slab.

The long side walls of the buildings are brick. But the short end walls are solid, poured-in-place concrete. These wind walls provide lateral stability for the relatively narrow buildings.

The contractors pour the end walls for each floor in one continuous pour. They developed a two piece, plywood-faced form for the job. One piece covers the entire outside of the walls and a second form covers the inside. These forms are light and can be moved quickly by a crane from one floor to the next. The forms are supported on bolts cast into the previously poured floor. This fast-moving forming technique is a big reason why the crews have been able to maintain their floor a day pace.

WALL FORMS—Crane places one-piece form for end wall. It will be fastened to bolts already cast into floor. This form was one of the reasons for the high daily production.

Safety Ideas

Driscoll goes to considerable effort to make working conditions on the job as safe as possible. This pays off in reduced insurance rates. Also, a clean, safe site improves the efficiency of the workmen on the job.

Driscoll never leaves exposed duct openings in the floor during construction. They form the openings with boxes whose sides are tapered so that they are easily removed later. The top of the box is ⅛ to ¼ in. below the top surface of the slab. Before the slab is poured, the box is filled with sawdust or crumpled paper.

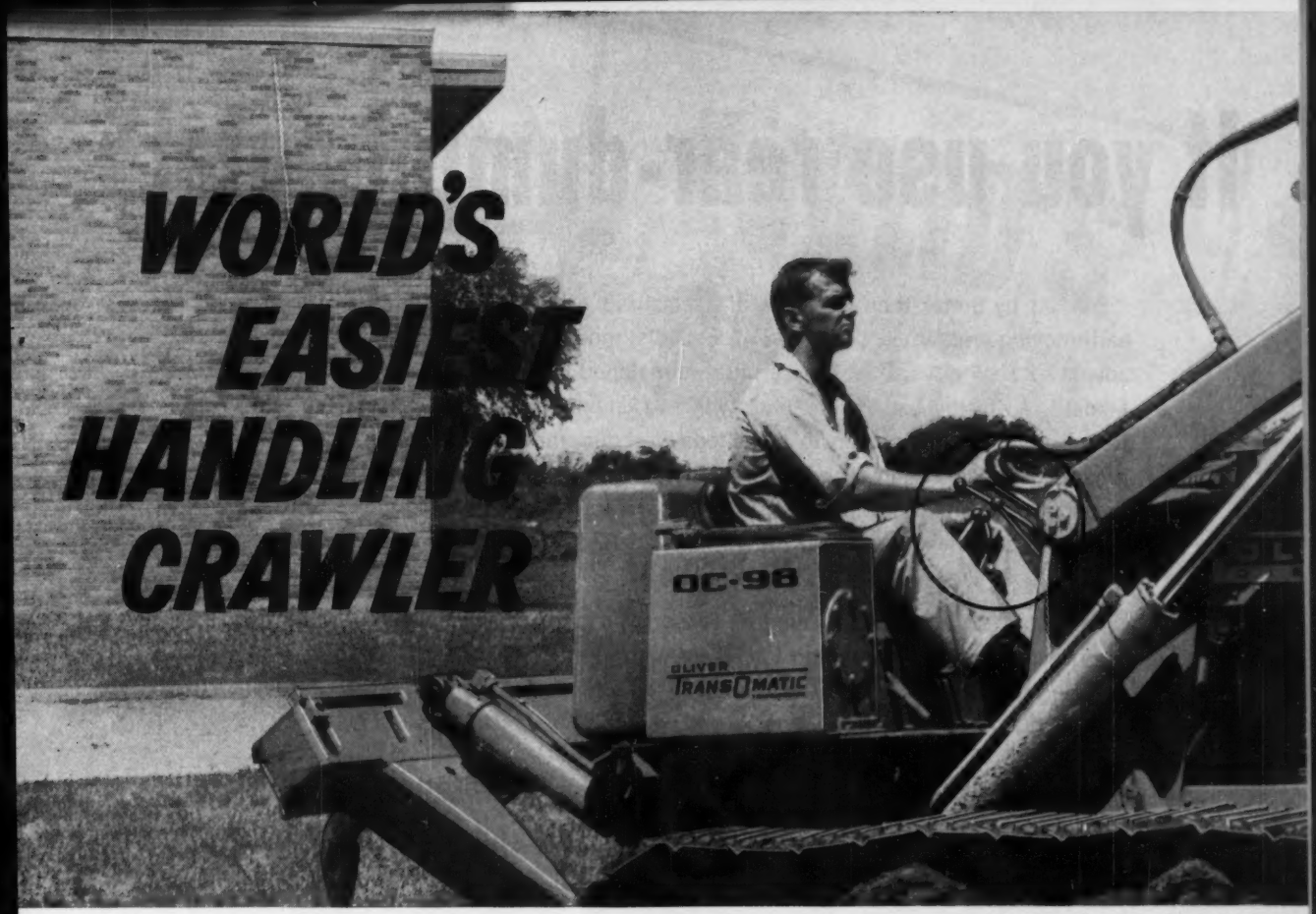
The concrete goes over the entire floor. It forms a thin skin over the top of the duct openings. When the concrete sets, this skin can support the weight of a man. The whole floor presents a smooth, unbroken appearance, and there is no chance of anyone tripping into a duct opening. But when the time comes to put in the duct, the concrete skin can be knocked out easily with a hammer.

Another safety technique is to keep the construction of stairways as close as possible (usually two floors) behind the floor pours. This reduces the need for ladders.

ANGLE GAGE—Operator has rigged yardstick on boom. Weight, passing over pulley to cab, slides up and down stick to indicate boom angle. The device is simple but accurate.

Men on the Job

Charles Haupt is concrete superintendent. Joseph Fetchko is construction superintendent. Project Managers are Fred J. Driscoll, Jr., and Joseph Van Etten.



62 gross engine h.p. with 1-yd. loader

Take the controls of a new Oliver Trans-O-Matic OC-96 Loader —and "let the tractor do the talking!"

Power shifting plus power steering (with three types of turns) makes the startling difference! The OC-96 is *so easy* to operate, it simply cannot be compared with older designs on this count—*or any other!*

You sit in a spacious, foam-rubber seat (offset for ideal visibility)...have full-freedom leg room in the wide, flush-deck compartment.

As for the controls, they're practically "in your lap." Levers for *power* steering, *power* reverse and *power* shift are placed directly ahead of the seat. Your arms are in "resting" position all the time. To brake or foot-steer, pedals do the job just as effortlessly.

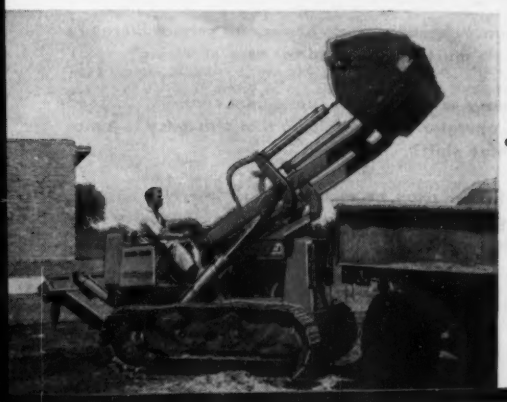
Easy operation, indeed! The *easiest* you ever had—plus.

NEW! 3 types of power turns—The only crawler its size giving you counter-rotation turns for about-faces in the tractor's own length—also spot turns and gradual turns.

NEW! Power shifting—Shift from forward to reverse instantly, on the go. No clutching, no gear-clashing with Oliver's all-hydraulic Trans-O-Matic transmission. Four speeds in high or low range—forward to 6.05 m.p.h., backward to 8.07 m.p.h.

NEW! Torque converter—The OC-96 has heaviest-duty torque converter (not automotive kind)—delivering full engine power for digging and crowding in fastest non-stalling operation. Advanced 62 gross h.p. diesel.

NEW 1-yd. loader design—See how the OC-96 is an *integral* tractor-loader minus high, hung-on parts and cross members. Loader side pedestals are actually part of the tractor for low profile, high stability, finest visibility and safety. Fast breakout, greatest dumping reach. No other its size has such rapid work cycle—is so rapid-reversing.



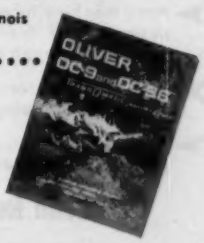
LOOK TO OLIVER FOR YOUR BEST BUY IN WHEEL AND CRAWLER TRACTORS

THE OLIVER CORPORATION

Dept. 2232, 400 W. Madison St., Chicago 6, Illinois

"Easy operation? Man, this OC-96 is the easiest I've ever seen!" "There has never been a crawler-loader like it for speedy, easy handling," says Lee Bruce of L. H. Bruce and Son, Middleton, Wisconsin.

On this big grading and loading assignment for a University of Wisconsin 2½-million-dollar student housing project, the OC-96 hustled the entire job. Six-yard trucks were put on a 2½-minute loading cycle. Counter-rotation turns cut time and working distance, permitted trucks to be spotted closer.



NEW CATALOG—"must" reading for cost- and com-

If you use rear-dump haulers

Backed by better than 25 years of specialized experience in building off-highway earthmoving equipment exclusively, Euclid's modern rear-dump line incorporates advanced engineering that is a result of unmatched field experience. From the 10-ton Model R-10 to the big 55-ton "Euc" with two engines and a total of 672 h.p., Euclid Rear-Dumps are job proved to meet today's requirements for big performance. This greater dimension... in range of capacities, in choice of engines, transmissions and tire sizes, and in type of hauler... and in parts and service facilities of a world-wide dealer organization, too... can mean lower hauling costs and more work-ability on every one of your rear-dump jobs.

Have the Euclid dealer in your area give you facts and figures to compare with your own hauling costs... you'll find Euclid's greater dimension pays off in a better return on your investment. EUCLID Division of General Motors · Cleveland 17, Ohio

Payload capacities of 10, 15, 18, 22, 27, 40 and 55 tons... also semi-trailer models of 12, 22, 35 and 50 ton capacity.

When you compare Rear-Dump Haulers, check these 7 points...

- is maker experienced in the field... known for building a dependable, well-engineered product?
- does machine have required performance ability needed... capacity and speed for high production work, power and traction for rough going and steep grades?
- well-balanced for size of loading equipment... hoppers and controlled dumping needs?
- is there good parts and service availability... at both manufacturer and dealer level?
- are maintenance manuals, parts books and service literature complete... is machine designed for easy servicing?
- is machine easy to operate... convenient controls... good visibility... operator comfortable so that efficiency is maintained for entire shift?
- can required production be maintained at low cost... construction rugged enough to withstand heavy service with minimum maintenance?

Euclid Rear-Dumps meet every one of these important requirements... and more!

...check

EUCLID'S GREATER DIMENSION

BIG POWER . . . BIG CAPACITY . . . BIG PERFORMANCE

Model R-27 has heaped capacity of 26½ yds. . . . rated payload is 54,000 lbs. . . . available with Cummins 335 h.p. or GM 336 h.p. engine . . . 4-speed Torqmatic Drive with converter lock-up and Torqmatic Brake . . . dual hydraulic booster steering . . . 18.00 x 25 tires on all wheels . . . rugged body with twin hoists . . . top speed with full payload, 34 mph. . . . available in two body types, standard for all-around use and quarry for hauling big rock.

ENGINEERED FOR EASY SERVICING

Like other Euclids, the R-27 is of simple, rugged design for years of dependable performance at minimum maintenance cost. When repair or replacement of major components is necessary, service-minded engineering saves time and money, too. For example, a transmission can be removed and replaced in just one-eighth the time required for the same work on a competitive hauler of the same capacity . . . engine replacement takes only one-half as many man-hours.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Construction Men in the News . . .

ALGOT F. JOHNSON

WALTER SCOTT

VICTOR G. HINDMARSH

Beaver Awards Go to Six Industry Leaders

SIX LEADERS in the construction industry received Golden Awards for 1960 at the fifth annual meeting of the Beavers in Los Angeles. The organization of western construction men honored:

In Management

Algot F. Johnson, chairman of the board of Al Johnson Construction Co., and Walter Scott, vice president of Peter Kiewit Sons Co.

Johnson entered the construction industry after working his way through the University of Minnesota School of Mines. After World War I he helped organize the firm of Johnson, Drake, and Piper. In 1927 he founded the Al Johnson Construction Co.

The son of Swedish immigrants, he has been honored by the King of Sweden for promoting cultural relationships between Sweden and the United States.

Scott got his start in construction doing odd jobs for his father, a contractor. Early in his career he worked as a carpenter on the Nebraska State Capitol. Years later, when the Capitol tower was being built, he was in charge of the project for Kiewit.

He graduated the University of Nebraska in 1923 and joined Kiewit in 1926. During World War II he was responsible for military construction.

Since 1946 he has participated in construction of the Friant-Kern Canal in California, the Eklutna Tunnel in Alaska, Bull Shoals Dam in Arkansas, Fort Gibson in Oklahoma, the Hyperion Outfall in Los Angeles, and various phases of the St. Lawrence Seaway and Niagara Power Development projects.

In Supervision

Victor G. Hindmarsh, senior vice president and director, Bechtel Corp.

Hindmarsh was a superintendent for J. H. Pomeroy & Co. in the late 1930s when he was loaned to the Bechtel Corp. as top man on a critical project. He has been with Bechtel ever since. By 1937 he was in charge of oil refinery construction, and in 1945 he became vice president and director. In 1951 he was named to his present post.

In this last capacity he had chief responsibility for the construction of the 120,000-barrel Aden Refinery for British Petroleum Co., Ltd., a project involving activity on three continents and a work force of 15,000 people.

Hindmarsh began his career in 1900 with the Southern Pacific Railroad. After four years in shipbuilding before and during World War I, he returned to construct bridges, dams, and tunnels with Grant Smith and Co., General Construction Co., and Bennet and White of Calgary.

Other Awards

In Engineering: W. J. Leen, chief of construction, Los Angeles District, Corps of Engineers.

In Supply: Tim J. Riley, San Francisco sales representative, Ingersoll-Rand Co.

Special Award: Lt. General Raymond A. Wheeler (ret.), former Chief of Engineers, U.S. Army.

American Bridge

CARROLL C. PETERSEN is the new western district construction manager for American Bridge Division of United States Steel. He was assistant to the district construction manager in New York and Chicago. Headquartered in San Francisco, he will direct construction projects in 11 western states.

A native of Alvord, Iowa, Petersen joined American Bridge as a draftsman in 1941 after graduation from the University of Nebraska with a degree in civil engineering.

Petersen supervised the steel erection for the 54-story Union Carbide building in New York.

NEW MUSCLE ON YOUR JOB--NEW OUTPUT TOO!

25-TON PR619 REAR DUMP...FROM ATHEY'S T-LINE!

The new Athey PR619 has built-in "muscle" of tough T-1* steel; the sinew to carry extra tons of payload for its weight, and the strength to take your biggest loads with ease. PR619 puts a wide stable target under your shovel for fast loading. It can maneuver in the tightest spots, hit speeds over 30 mph behind the rugged Caterpillar No. 619 Tractor.

PR619 plus features include fast, 12 second dumping, a low center of gravity for easy handling and safe operation, self-aligning two-stage hydraulic hoists and a payload capacity 2½ times empty vehicle weight!

Find out how this new team can cut your cost, speed your cycles and get greater production under your present loading equipment. Your Athey-Caterpillar dealer is the man to see.

*Registered trademark, United States Steel Corporation

Write for fact-filled brochure on the Athey PR619 Rear Dump Trailer to get the data on this new unit.

BONUS PAYLOAD—You haul more payload, less dead weight with the PR619. Low slung design permits fast hauling, tight turns with complete safety.

12 SECOND DUMP—It's that quick with the PR619. Twin, two-stage hydraulic hoists lift body quickly—straightline body interior slides load out completely.

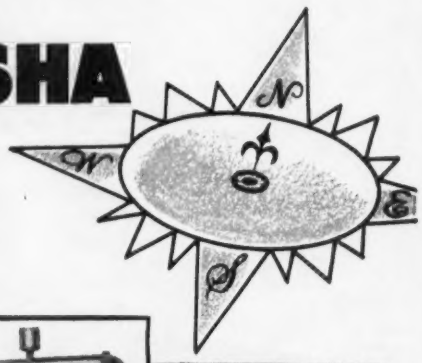
Athey

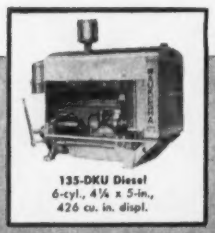
PR619

REAR DUMP TRAILER

Athey PRODUCTS CORPORATION, 5631 WEST 65TH STREET, CHICAGO 38, ILLINOIS

Whatever the job *wherever it is* . . . there's a WAUKESHA to do it




135-DKU Diesel
6-cyl., 4¼ x 5-in.,
426 cu. in. displ.

145-GZB Gasoline
6-cyl., 5⅛ x 6-in.,
817 cu. in. displ.

148-DKB Diesel
6-cyl., 5¼ x 6-in.,
779 cu. in. displ.

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Construction
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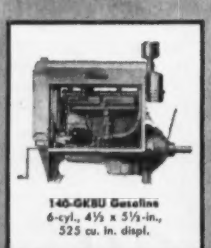
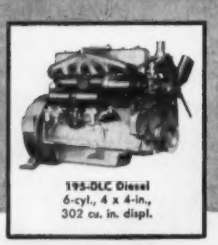
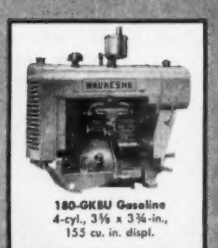
WAKDBSU Diesel
6-cyl., turbosupercharged
6¼ x 6½-in., 1197 cu. in.

VLRDBU Diesel
V-12, 8½ x 8½-in.,
5788 cu. in. displ.


140-GKBU Gasoline
6-cyl., 4½ x 5½-in.,
525 cu. in. displ.


195-DLC Diesel
6-cyl., 4 x 4-in.,
302 cu. in. displ.


180-GKBU Gasoline
4-cyl., 3⅛ x 3¾-in.,
155 cu. in. displ.

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DIESEL . . . GASOLINE . . . LPG

ENGINE-GENERATOR SETS
(ENGINATORS') to 800 KW

For service—in any country—or any climate—stamina and dependability are *built-in.* Power packed—to pay profits in fast, smooth performance, fuel economy, and low upkeep—Waukeshas are the choice of operators and contractor-owners alike. Find out *why* from your Waukesha distributor.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
NEW YORK TULSA LOS ANGELES
Factories—Waukesha, Wisconsin, and Clinton, Iowa

457

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distribution, sales personnel and other activities.

Distributor Appointments

Koehring Co.: The Kwik-Mix Division has appointed the following distributors: The Gleasner Corp. of Buffalo, N. Y.; Denver Air Machinery Co. of Denver, Colo.; and August Honeck and Son, of Malinta, Ohio.

Young Spring & Wire Corp.: The Daybrook Hydraulic Division has appointed Weston Dump Body Co. of Des Moines, Iowa, as sales and service representative.

Warren Tool Corp.: The company is now represented in Texas, Oklahoma, Louisiana, and Arkansas by H. A. Varner and R. E. Cox, operating under the partnership name of H. A. Varner and Associates, with offices in Dallas and Houston.

Bucyrus-Erie Co.: The W. W. Williams Co. of Columbus, Ohio, has been appointed crane-excavator-rotary drill distributor for the state of Ohio, and some counties in Kentucky and Indiana.

General Motors Corp.: The Euclid Division has appointed Harris-Euclid, Inc., of Sioux Falls, S. D., as distributor.

The Yale & Towne Mfg. Co.: The Trojan Division has appointed the General Supply & Equipment Co. of Baltimore, Md., as the Trojan tractor shovel distributor for the entire state of Maryland and for Kent and Sussex Counties in Delaware. The Yale Materials Handling Division has appointed Dees Equipment Co. of Greensboro, N. C., as franchise representative for Yale industrial lift trucks and tractor shovels in eastern, central and northwest North Carolina, and Marshall Supply & Equipment Co. of Tulsa, Okla., as distributor for the state of Oklahoma.

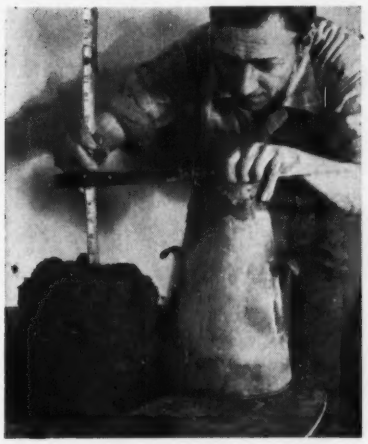
continued on page 166

ALPHA

BETTER CONSTRUCTION THROUGH
BETTER USE OF CEMENTS

news and notes from the field

MIX WATER CAN BE COSTLY!



Water is used in concrete to lubricate the mix and act chemically with the cement to form the paste which glues the aggregates together. Too much water dilutes the paste and makes it weaker—less solid.

How Much is Too Much?

In a 5-bag concrete mix using about 36 gallons of water per cubic yard—including moisture in the aggregate—only about *half* the water combines with the cement. The rest is a lubricant which eventually causes voids in the concrete. Recommended slumps for different jobs are listed in the table at upper right.

Recommended Slumps for Various Types of Construction*

Type of Construction	Slump, in.**	
	Maximum	Minimum
Reinforced foundation walls and footings, and thin plain walls	5	2
Plain footings, caissons, and substructure walls	4	1
Slabs, beams, and reinforced walls	6	3
Building columns	6	3
Pavements	3	2
Heavy mass construction	3	1

*Adapted from Table 4 of the 1940 Joint Committee "Report on Recommended Practice and Standard Specifications for Concrete and Reinforced Concrete."

**When high-frequency vibrators are used, the values given should be reduced about one-third.

Results of Too Much Water in a Mix

1. Higher labor costs—When workmen have to wait for the mix to stiffen or for excess water to soak into the subgrade or evaporate, overtime costs run high. In cold weather, as much as 6 to 12 hours in extra time can be the result.

2. Excessive bleeding—As concrete bleeds, water comes to the surface. If there is excessive bleeding, the water brings aggregate fines to the surface which often causes dusting and crazing.

3. Sand-streaked walls—Excess water bleeds up the sides of forms, washing out the cement paste leaving a streaked, raw, unattractive wall surface.

4. Segregation—Coarse aggregates settle to the bottom, leaving a weak layer of water and fines on the surface. The lower sections of the concrete often have honeycombed areas because of cement-water paste leaking out of the forms.

5. Excessive cracking—Foundation walls and floors crack excessively from high shrinkage and low tensile strength caused by excessive mixing water.

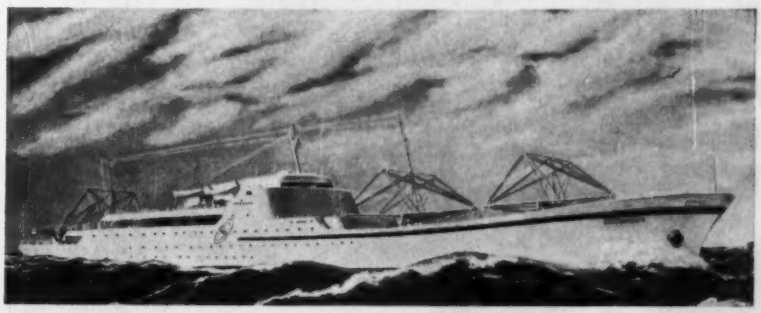
6. Rough surface—It is more difficult to get a smooth surface because deep trowel marks are a common problem in concrete containing excessive amounts of water.

7. Leaky walls and wet floors—Both can result from excessive voids in concrete caused by too much water.

8. Surface scaling—Air is entrained in concrete to protect it from freezing and thawing damage. When the slump is greater than 6 inches, the air content decreases and this important protection is reduced.

Stiff concrete is much less expensive when measured in man hours. It may require more labor initially to get it in place but can be finished sooner . . . your bonus is a satisfied customer—and a good job that will not have to be repaired or replaced.

AN ALPHA EXCLUSIVE



FIRST NUCLEAR POWERED commercial ship, the N. S. Savannah, being built by New York Shipbuilding Corp., Camden, N. J. Alpha cement has been chosen for building the heavy concrete encasement used for the atomic reactor shield. Concrete will weigh 260 lbs. per cu. ft. compared to normal weight of 145 lbs. per cu. ft. Job is continuous pour by pressure or injection grouting, done by Intrusion Prepakt Company of Philadelphia. Alpha cement will be supplied by the Camden Lime Co., Camden, N. J.

ALPHA
PORTLAND CEMENT COMPANY
Alpha Building, Easton, Pa.

OWEN BUCKETS

THE GIANT OF THEM ALL

The following five combined features make OWEN the big giant performer . . . for any type of clamshell work . . . for any model or make of crane.

1. Block and Tackle Type Reeving
2. One-Piece Head Construction
3. Riveted Bowl Assembly
4. Single Main Shaft
5. Recessed Lips

Added to these construction features are more than fifty years experience in the manufacturing of clamshells . . . and nothing else! For any job that requires a clamshell, there is an Owen to fill the bill . . . backed by proven construction design and over one-half century of experience.

Put the Giant on your crane — OWEN — and know the work will be done faster, better and more economically.

Write today for any specific or additional information

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

SALES AND SERVICE . . .

continued

Western Machinery Co.: The following three distributors have been appointed: The Double-H Equipment Co. of Syracuse, N.Y.; Eastern Equipment Sales, Inc., of Springfield, Mass., and East Hartford, Conn.; The Lively Equipment Co. of Albuquerque, N. Mex.

On the Sales Front

The Lincoln Electric Co.: A new district office has been established in Washington, D. C. William P. Douglas, field welding engineer for the company, has been named the district manager.

Armco Drainage & Metal Products, Inc.: The Great Lakes Division announces the following appointments: George R. Betts, now division sales manager, becomes assistant division manager; William A. Carleton, now Lansing district sales manager, becomes division sales manager; and Walter O. Woodhouse becomes manager of Lansing district sales.

LeTourneau - Westinghouse Co.: Robert S. Marshall is the new district representative in upstate New York and the province of Quebec. He will make his headquarters in Syracuse.

Dodge Mfg. Corp.: Thomas P. Grace has been appointed sales representative for the island of Manhattan.

A. O. Smith Corp.: Edward P. Mitchell has been added as a sales engineer to the Eastern Region sales staff of the Welding Products Division.

L. B. Foster Co.: The following three sales representatives have been added to the New York office: Howard R. Elliot; Andrew Z. Koi; and Carl M. Duede.

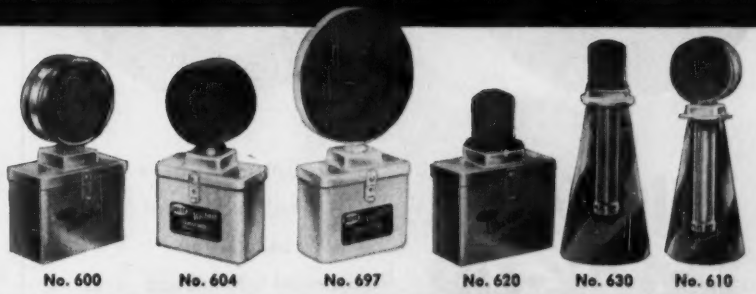
Worthington Corp.: Graham Ross has been appointed manager of sales for the Plainfield (N.J.) Division. He will be responsible for sales of truck mixers, pavers, and allied construction equipment made at the Plainfield plant.

A. O. Smith Corp.: William Arter has joined the Los Angeles sales staff of the Welding Products Division. He will service the southern west coast area on A. O. Smith's C-OManual and C-

On YOUR jobs . . . play it SAFE . . . with the DIETZ 3-WAY Hazard Warning System!

Use DIETZ
VISI-FLASH LIGHTS
to alert the oncoming driver:

1



No. 600 | No. 604 | No. 697 | No. 620 | No. 630 | No. 610

Brightest, safest, most trouble-free flashers on the market. Warn: "Danger Ahead."

Use DIETZ
LANTERNS
to locate hazard in relation to the driver's position:

2

No. 1 | No. 8 | No. 100 | No. 40

Show exact location, shape, extent, and boundaries of hazard area. Burn up to 100 hours.

Use DIETZ
TORCHES
to guide driver around the hazard:

3

No. 750 | No. 87 | No. 751 | No. 96

Fully illuminate the danger in every weather. Burn up to 48 hours on low cost kerosene.

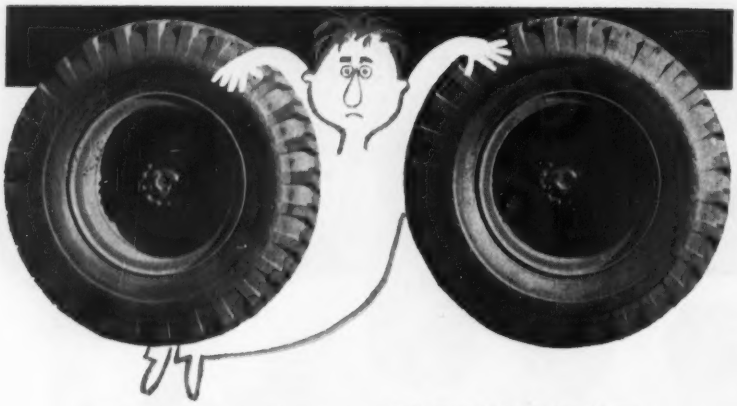
Go DIETZ and you go Safely

NEW! DIETZ HAZARD WARNING PLANNER
For Highway Construction and Maintenance

Slide-Chart quickly shows how, when, and where to use each type of warning light for maximum safety under all weather conditions and all types of roads and speeds.

SEND $1 FOR EACH CHART TO:

R. E. DIETZ COMPANY
114 Leavenworth Ave. Syracuse 1, N.Y.



NEED A BACK-UP ALARM?

Call your Bullard distributor he has a mechanical one — that works better, is less costly, easier to install, and takes no maintenance. Pick up your phone right now, or write for literature.

BULLARD
INDUSTRIAL SAFETY EQUIPMENT

E. D. BULLARD COMPANY
SAUSALITO, CALIFORNIA

EVER SEE A CONTINUOUS TRULY UNDISTURBED SOIL SAMPLE 15, 30 OR EVEN UP TO 60 FEET IN LENGTH

In addition to being able to secure conventional type soil samples, Sprague & Henwood, Inc., also has available the Swedish Soil Sampler to recover undisturbed samples 15, 30 or even up to 60 feet in length. With this device, slide resistance and wall friction are almost eliminated and thin critical layers of soil that usually go unnoticed are easily detected.

Let us help you in solving your foundation testing problems. We have the equipment, personnel, and drilling "know-how" necessary to undertake your particular project. Our complete drilling service is illustrated and described in the new S&H Contract Brochure, write for your copy today.

A Sprague & Henwood crew recovering a 30 foot sample of sensitive marine clay.

SPRAGUE & HENWOOD, Inc.
SCRANTON 2, PA.

S&H SINCE 1853

New York—Philadelphia—Atlanta—Pittsburgh—Grand Junction, Colo.—Buchans, Nfld.

SALES AND SERVICE . . .

continued

OMatic welding equipment and handle sales of DC power sources for welding and other applications.

Buck Equipment Corp.: Robert (Rudy) A. Rudinski has been named eastern regional sales manager for Buck. His territory will include New England, New York, Pennsylvania, Maryland, Delaware, New Jersey, Virginia, West Virginia, and the eastern portion of Ohio, including Cleveland.

In the Main Office

Chrysler Corp.: William L. Pringle has been appointed president of the Marine and Industrial Engine Division, succeeding A. S. Hudson, who has resigned.

Crane Co.: Wesley A. Songer has been elected president and chief administrative officer. He formerly was executive vice president.

Pemco, Inc.: Robert M. Litschewski has been appointed general manager of the company. He will be responsible for all manufacturing functions as well as product development.

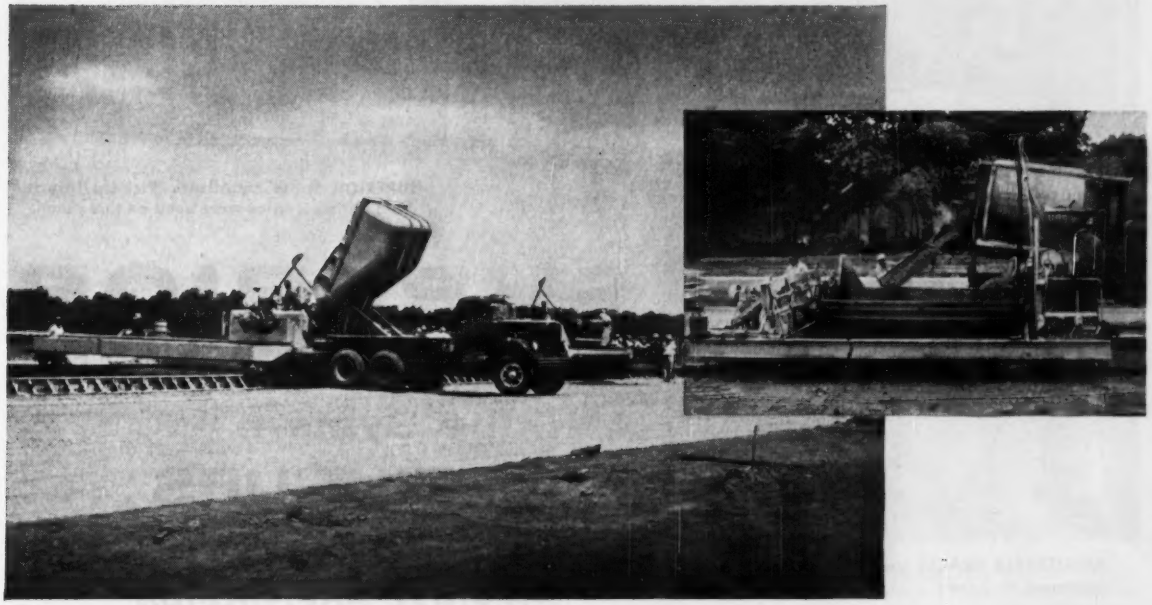
Link-Belt Co.: C.. M. (Cal) Basile has been elected president of Link-Belt Speeder Corp., a subsidiary of Link-Belt Co. He succeeds D. W. (Dave) Lehti, who is retiring after 25 years with the company.

Johns-Manville Corp.: C. B. Burnett has been elected president and chief operating officer of the corporation. A. R. Fisher will relinquish his present office of president, but will contiuue as chairman and chief executive officer.

Portland Cement Association: The following five new members have been elected to the board of directors: Chester S. Crawford, president of Whitehall Cement Mfg. Co.; L. R. Forbrich, general manager of Green Bag Cement Division, Pittsburgh Coke and Chemical Co.; Ellroy King, president of the Halliburton Portland Cement Co.; Frank B. Warren, president of Bessemer Limestone and Cement Co.; and W. S. Ziegler, president of the Saskatchewan Cement Co., Ltd.

continued on page 171

HOW TO CUT COSTS EVERY TIME YOU PAVE WITH CONCRETE



You'll save time and labor...regardless of yardage handled...with the 30-second-spread cycle of Maxon Dumpcrete Concrete Spreaders

15 seconds to spread... 15 seconds to move and strike-off. That's the fast 30-second cycle of Dumpcrete Spreaders that cuts paving costs whether you lay an airport runway or widen a city street.

One man operates the Dumpcrete Spreader... places 180 to 260 cu. yds. of concrete per hour—full depth, base course or top course. Hydraulic controls simplify operation. Widths are adjustable from 11 to 16′ or 20 to 25′, depending on model. And the Dumpcrete Spreader handles concrete of lowest possible slumps.

Team the Dumpcrete Spreader with Dumpcrete Bodies, and you'll get all the cost savings possible through central mixing with non-agitated hauling. Or—use the spreader with transit-mixers to reduce time and labor costs for concrete placement. Contractors proved last season that you can save time and labor either way!

Find out how you can step-up hourly production with the Maxon Dumpcrete Spreader and Dumpcrete Bodies. Send the coupon for catalogs today, or call your Dumpcrete distributor.

MAXON

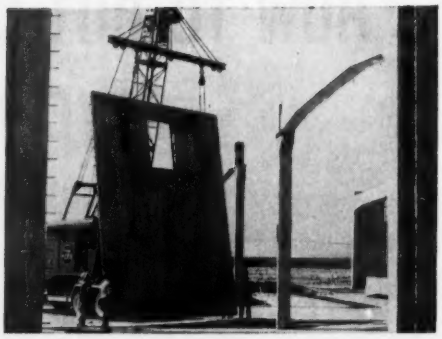
Dumpcrete Hauling Bodies
and
Dumpcrete Paving Spreaders

MAXON CONSTRUCTION COMPANY, INC.
Manufacturing Division C-2 —2600 Far Hills, Dayton 19, Ohio

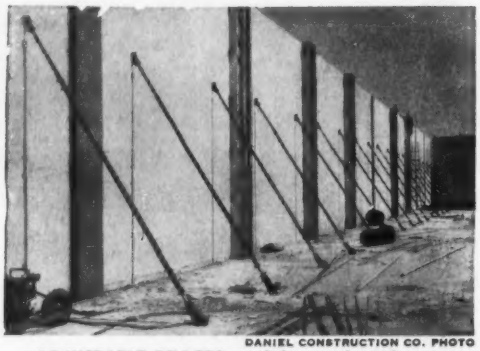
NAME_____
TITLE_____
FIRM_____
ADDRESS_____
CITY_____ ZONE___ STATE_____

WAREHOUSE

DANIEL CONSTRUCTION CO. PHOTO



SUPERIOR Stress Equalizers, Pick-Up Inserts, and Lifting Angles were used on this panel.



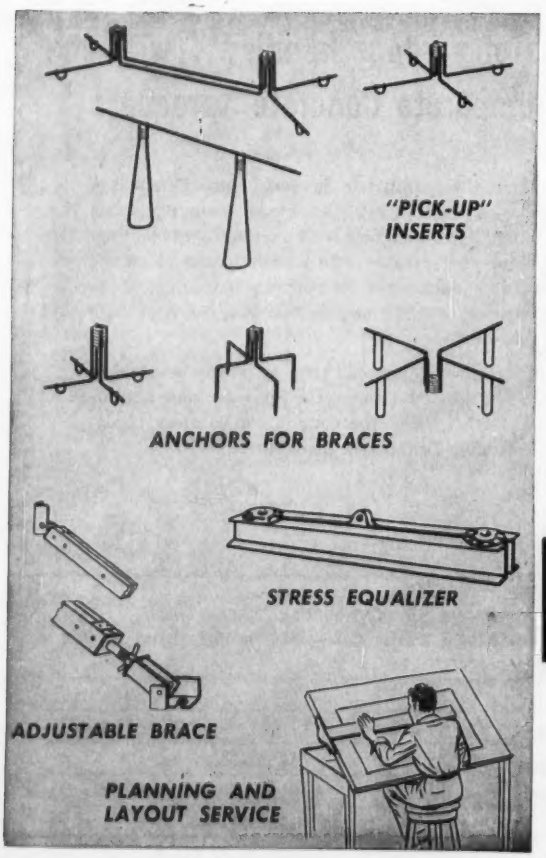
DANIEL CONSTRUCTION CO. PHOTO

ADJUSTABLE BRACES used for quick and easy alignment of panels

SUPERIOR

Has the Accessories AND the System for TILT-UPS . . .

FROM ORIGINAL LAYOUTS TO FINAL POSITIONING



In addition to tilt-up accessories which have been used and proven on thousands of conventional as well as unusual projects in this field, SUPERIOR also provides the *system* for the entire job, from original planning and layouts, to the final positioning of the precast panels.

As the pioneer in this field, SUPERIOR has recently developed a special Stress Equalizer for reducing lifting stress in tilt-up panels of over 20 ft. high. It offers two advantages: (1) Less concrete reinforcing steel is required for stresses which occur at time of lift; (2) Permits use of simplified crane rigging.

On your next tilt-up job, avoid expensive crane delays, be assured of safety, and reduce overall costs! Specify the SUPERIOR System.

For details request a copy of Bulletin TU-4.

SUPERIOR
CONCRETE ACCESSORIES, INC.

9301 King St., Franklin Park, Ill. (Suburb of Chicago)

Pacific Coast Division Office and Factory:
2100 Williams Street, San Leandro, Calif.

New York Office:
39-01 Main St., Flushing 54, New York

Houston Office:
4101 San Jacinto, Houston 4, Texas

SALES AND SERVICE . . .

continued

Hyster Co.: Fred Welch has been appointed general parts and service manager and will also assume full responsibility for the operation of eight company-owned retail dealerships in key cities throughout the country. Robert F. Moody has been appointed general sales manager of the company.

Worthington Corp.: George F. Habach, now vice president—engineering, has been promoted to the newly-created post of vice president—administration. Rear Admiral (ret) Albert G. Mumma, formerly Chief of the Bureau of Ships, USN, becomes vice president—engineering.

Associations

Prestressed Concrete Institute: The institute has established new headquarters at 205 West Wacker Drive, Chicago, Ill. The move from Boca Raton, Fla., was designed to provide greater centralization of activity. The new headquarters will maintain an up-to-date library for the use of members, engineers, construction experts, architects, trade editors, and students.

Special Mention

Ellicott Machine Corp.: The company has joined with Timberland Machines, Lt., of Woodstock, Ontario, Canada, to form a new Canadian company to be known as Timberland-Ellicott, Ltd. The new company will manufacture in Canada the line of Ellicott dredges and dredging machinery.

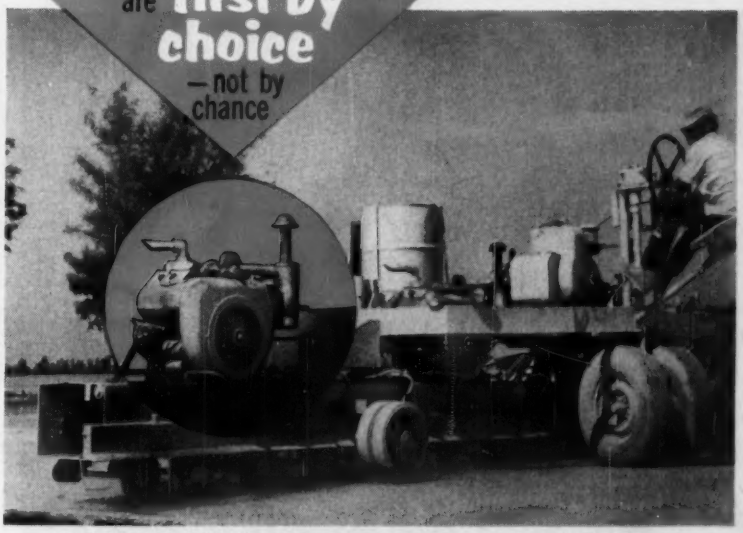
Burke Concrete Accessories, Inc.: Announcement of a new corporation named Burke Concrete Accessories, Inc., has been made by its president, George O. Gaetke. The new corporation has taken over the assets of W. J. Burke & Co., incorporated in 1931. Office and warehouse facilities are located in Seattle, Wash., Portland, Ore., Sacramento, Oakland, Los Angeles, San Bernardino, and San Diego, Calif., and Albuquerque, N. Mex.

Unit Crane & Shovel Corp.: Unit and Steel & Co. Ltd., of England, one of the world's largest crane manufacturers, have made a deal whereby Unit will build and sell Coles cranes in North America.

In the construction field...

WISCONSIN ENGINES

are first by choice —not by chance



SELF-POWERED 16-BLADE SAW — the newest in paving tools, made by Cutcrete Manufacturing Co., El Monte, Calif. — has four Wisconsin Engines, three 37-hp units and one 18-hp. User reports: No concrete has been found yet that is hard enough to lug these engines down!

The number of Wisconsins used in construction is apt to make you wonder whether anyone else makes engines in the 3- to 56-hp class. They do — but not like Wisconsin builds them. And leading builders of construction equipment know it.

This OEM preference is based on the all-around quality and dependability of Wisconsin engines — not price. Builders know that Wisconsin power protects the service reputation of their machines as well as your continued good-will.

Heavy-duty, precision-fitted engine construction assures smooth, dependable power and minimizes wear. Basic high torque provides load-lugging power that enables the engine to slug through sudden shock loads without stalling or damage — and keeps men and machines working.

Air-cooling eliminates freeze-ups and dry-ups. You won't need water or anti-freeze. You just start the engine — whether it's 35° F. below zero or 140° F. above — and let it run!

Specify Wisconsin air-cooled engines on the equipment you buy. Sizes from 3- to 56-hp. — single,- two-, and V-type four-cylinder models — with manual or electric starting. Convenient, expert service available through more than 2000 Authorized Service Stations. Send for Bulletin S-249. Write Dept. C-30.

WISCONSIN MOTOR CORPORATION

MILWAUKEE 46, WISCONSIN

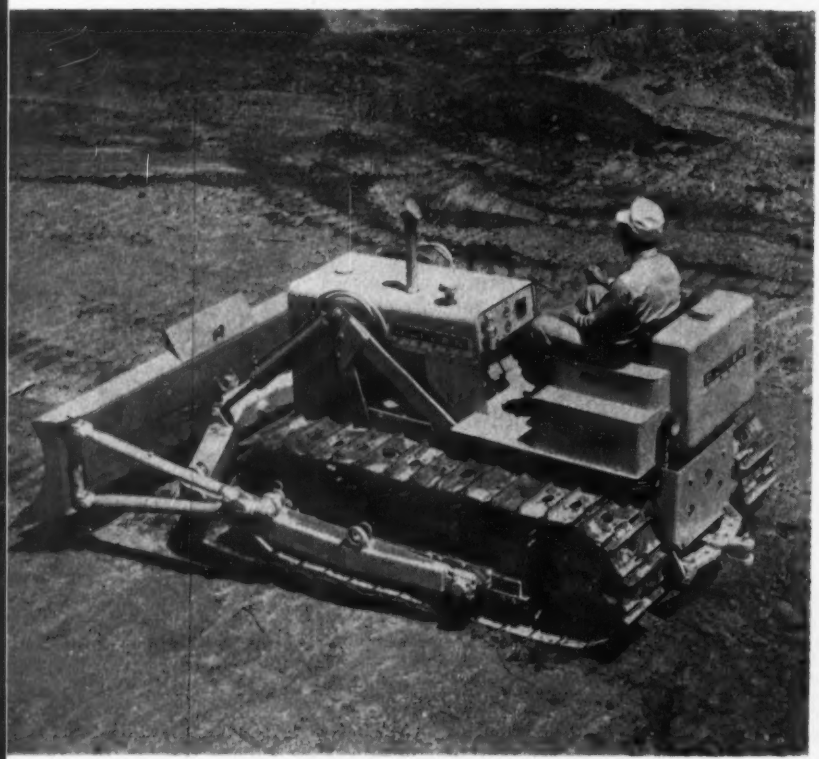
World's Largest Builders of Heavy-Duty Air-Cooled Engines

THE BEST IN SIGHT IS BERGER

WALTER KIDDE CONSTRUCTORS line up National Biscuit ovens with BERGER Polara Transit

C. L. BERGER & SONS, INC.
53 Williams St., Boston 19, Massachusetts

Construction Equipment News...



Crawler's Tracks Operate Independently

The Oliver OC-9 crawler tractor rides on 6-ft-long tracks that can be controlled independently. The transmission controls both the crawler's speed and direction and permits it to make three types of turns—spot turns on one track, turns with tracks operating in opposite directions, or gradual turns within any radius. Hydraulically actuated disk clutches, operating in oil, accomplish the steering.

A 4-cyl, 62-hp diesel engine powers the OC-9. Net flywheel horsepower is 57. The bare tractor weighs 9,675 lb and develops a drawbar pull of 16,900 lb. A torque converter drive between the engine and transmission eliminates clutching and hydraulically cushions shock loads.

The tractor is also available as the OC-96, a loader with a capacity of 1 cu yd.—**The Oliver Corp., 400 W. Madison St., Chicago 6, Ill.**

Belt Loader Fits Motor Graders

A belt loader with a 30-ft conveyor can discharge at a height of 15½ ft and can load up to 800 yd per hr. The Jeb-Loader fits LeTourneau-Westinghouse and Caterpillar motor graders.

A cutting disk feeds material to a trough-shaped belt that moves at 614 fpm. Scrapers, bolted to the conveyor frame, clean the belt. Crowned pulleys keep the belt centered, and vertical guide rollers protect its edges.

Most of the conveyor weight rides on a two-wheel stabilizing tandem. The wheels oscillate vertically. When traveling on the highway, the conveyor is disconnected and trailed behind the grader on the tandem wheels.—**Jebco, Inc., Blair, Neb.**

Crawler Crane Has Pivoting Outriggers

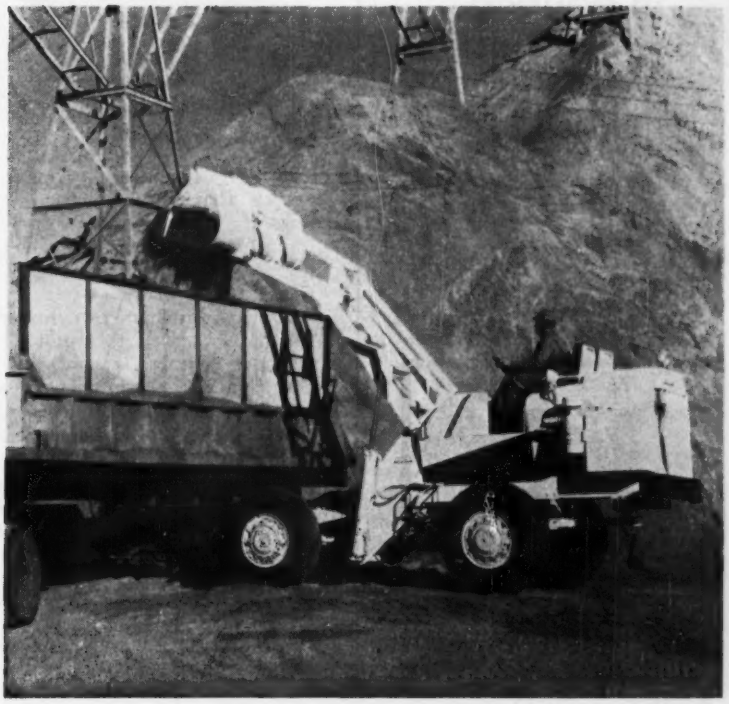
Working with outriggers in the down position, the Koehring 330 Sprawler crane has a capacity of 60,000 lb. It can handle this load with a 30-ft boom at a radius of 12 ft.

Without outriggers, the crawler-mounted unit can lift and carry 47,980 lb with a 30-ft boom at a 10-ft radius. The pivoting outriggers are similar to those on other Sprawler cranes.—**Koehring Div., Koehring Co., 3026 W. Concordia Ave., Miliwaukee 16, Wis.**

Spreader Handles Surfacing Jobs

An attachment that fits wheel tractors spreads surfacing materials in thicknesses ranging up to 2½ in. It can handle crushed limestone, dolomite, asphalt, or slurry seal for cracked pavements.

Any tractor with a three-point lift can handle the Hester utility grader-applicator.—**Hester Plow Co., 1721 Egner St., Jacksonville 6, Fla.**



Loader Carries Anything It Can Lift

A long wheelbase gives the Lull loader good stability, enabling it to carry any load it can lift. It can back up a 35-deg slope with a full bucket. Even with the long wheelbase, the turning radius is only 8 ft 8 in.

The loader can lift 10,000 lb, and the bucket holds 1½ yd. Dumping height is 10½ ft. The rear axle of the four-wheel drive loader oscillates 26 in. and gives it good traction on uneven ground.

None of the machines's moving parts obstruct the operator's visibility while working. Because of the low front silhouette, the bucket is visible in all positions. An enclosed cab is optional.—**Lull Engineering Co., 3045 Highway 13, St. Paul 11, Minn.**

Here's an Idea!

GAR-BRO helped cut costs in pouring concrete piers!

One contractor cut the time in placing concrete on this bridge job by planning ahead. Here, on these two bridge piers, note that he used three complete units comprised of Gar-Bro Collection Hopper and a string of Steel Chutes plus a Gar-Bro Bucket. He used the hopper and chutes to direct the concrete into the forms and prevent segregation.

His object was to prevent any delays by using one hopper and chute unit to place concrete in one pier, while the second one was set in place in the other pier, and the third one (see it hanging in rack between piers) was being shortened. Delays of transit mixers and the crane were minimized by rotating the hopper and chute units and shortening the chute line to the new level of the concrete in each pier.

It's a good idea to team up your Gar-Bro Concrete Handling Equipment to save time and cut costs.

See your Gar-Bro dealer or write for Catalog and Concrete Handling Manual today!

Gar-Bro Mfg. Co. — Los Angeles, Calif.—Peoria, Ill.

General Offices: 2415 E. Washington Blvd., Los Angeles 21, Calif.

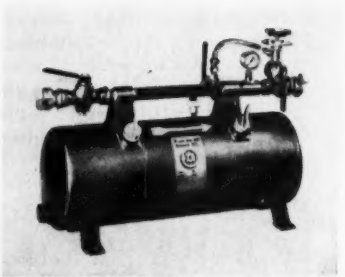
GAR-BRO

The World's Most Complete Line of
CONCRETE HANDLING EQUIPMENT

Electric Power Runs Small Compressor

The new Thor SpeedCompressor weighs only 91 lb. It is 26 in. long, 16¾ in. wide, and 27 in. high. A ½-hp shock resistant electric motor powers the unit. It delivers compressed air at pressures as high as 150 psi.

The unit's 12-gal air tank is equpiped with an automatic air control switch and an automatic relief valve. A 20-ft hose delivers the air where needed.—**Speedway Div., Thor Power Tool Co., 1421 Barnsdale Rd., LaGrange Park, Ill.**



Cleaner-Oiler Services Air Tools

The Von Arx cleaner-oiler is a device that services pneumatic tools in a single operation. It eliminates manual dismantling, cleaning, oiling, and reassembling of these tools.

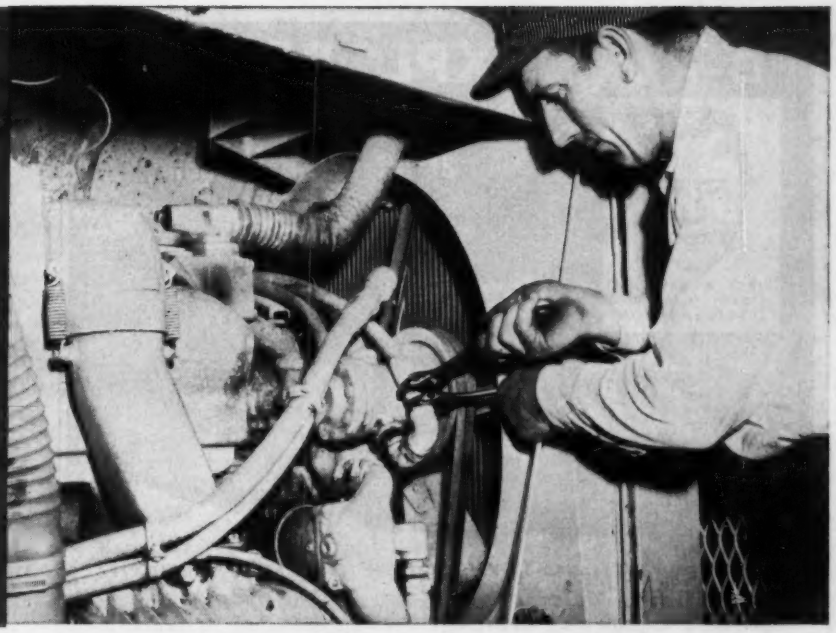
A two-compartment cylinder is the main part of this unit. The cylinder contains solvent and oil that are mixed in proper proportions, atomized, and forced through the tool by compressed air.

The solution passing through the tool can be examined to determine whether the cleaning is completed. The manufacturer claims that only a few seconds are necessary to service tools with this device. The unit weighs about 30 lb.—**The Marindus Co., 51 Pine St., New York 5, N.Y.**

REDUCE DOWNTIME

SPEED REPLACEMENT

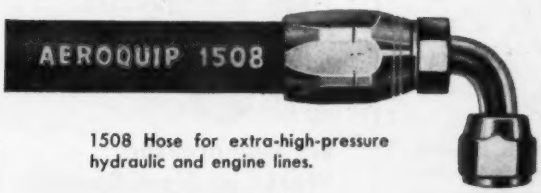
CUT MAINTENANCE COSTS



Aeroquip Hose and Reusable Fittings Help Keep Equipment on the Job...Making Money for You!

1503 Hose for medium-pressure hydraulic and engine lines.

1509 Hose for high-pressure hydraulic and engine lines.



1508 Hose for extra-high-pressure hydraulic and engine lines.

Fittings available: Male pipe; swivel nut—S.A.E. or J.I.C.; split flange ends. Straight or elbow.

5600 PUSH-PULL Self-Sealing Couplings for hydraulics.

A broken fluid-carrying line could ruin your work schedule by putting a vital piece of equipment down . . . but with Aeroquip Hose and Reusable Fittings, it goes back to work *fast*.

Using Aeroquip Bulk Hose and Reusable Fittings, replacement hose lines are made up in minutes, with simple hand tools, in the shop or in the field. Many contractors have standardized on Aeroquip Hose and Reusable Fittings because they simplify maintenance and cut costs. Since the fittings are designed to be reusable, they can be used over and over to make up replacement hose lines, greatly reducing hose line cost. Your Aeroquip Distributor, a fluid line specialist, is listed under "Hose" in your Yellow Page Phone Book. *Call him today.*

PUSH-PULL is an Aeroquip Trademark

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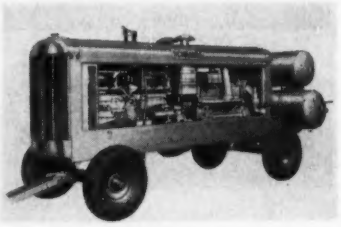
Pneumatic Roller Weighs 35 Tons

The Ferguson 3507 pneumatic-tired roller weighs 21,700 lb when empty, and 70,000 lb when fully ballasted. The roller's seven wheels are equipped with 90-lb tires. Tires for 120-lb pressure are optional. Wheel loads vary from 3,100 lb to 10,000 lb depending on ballast. All wheels oscillate. The roller covers a width of 8 ft.

Power comes from a 125-hp GM diesel engine. The drive train includes an Allison transmission with torque converter and a Clark rear end with a roller chain final drive. Maximum rolling speed is 8 mph. The unit is equipped with air brakes.

Instruments, control levers, and the driver's seat are mounted on an arm revolving on a central column. This allows the driver to swing from side to side with complete control and good vision from any position.—**Shovel Supply Co., Box 1369, Dallas 21, Texas.**



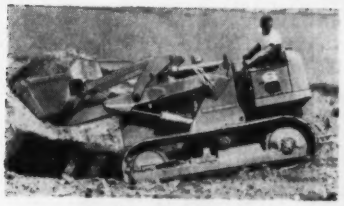
Big Compressor Works at Slow Speeds

The Schramm 600-TC air compressor delivers 600 cfm at 100 psi even at altitudes as high as 10,000 ft. Its low operating speed of 1,200 rpm is claimed to increase engine life and reduce wear and maintenance.

A turbocharged International Harvester diesel engine powers the unit. It is equipped with an electric starter, a 12-volt battery and generator, and a Schramm Pneumastat, a patented device

that automatically regulates the speed in accordance with the air demand. A single liquid system cools both the engine and compressor.

Special equipment available on the compressor includes automatic safety shutdowns, brakes, a scavenging pump for operation at angles up to 20 deg, and aftercoolers for applications requiring moisture-free air. — **Schramm, Inc., 900 E. Virginia Ave., West Chester, Pa.**



Tractor Shovel Now in Production

The Allis-Chalmers 1½-yd HD-6G tractor shovel is now in production. It is a crawler-mounted unit with a dumping height of 9 ft. Breakout power is 21,500 lb. The curved bottom bucket tips back 40 deg at ground level.

An Allis-Chalmers four-cycle diesel engine powers the tractor shovel. It is rated at 72 hp. A single shift lever selects any one of four forward or two reverse speeds. Top speed is 5.5 mph. The unit has a 24-volt electric starting system, a decelerator pedal, and a bucket level indicator.

The construction permits removal or replacement of major assemblies without disturbing adjacent parts of the tractor shovel. Attachments for the HD-6G include a ripper, backhoe, rock bucket, rock fork, light materials bucket, lift tongs, lift forks, crane hook, and straight and angling dozers.—**Allis Chalmers Mfg. Co., Milwaukee 1, Wis.**

Single-Stage Rotary

The Jaeger model 85 air compressor has a rating of 85 cfm at 100 psi. It is a single-stage, oil-cooled rotary unit.

Power supply is a 45-hp, 4-cylinder Continental F-162 gasoline engine. Standard equipment includes hour meter, automatic blow-down valve, retractable pneumatic-tired dolly wheel, and 12-volt electric starter.—**The Jaeger Machine Co., 800 Dublin Ave., Columbus 16, Ohio.**

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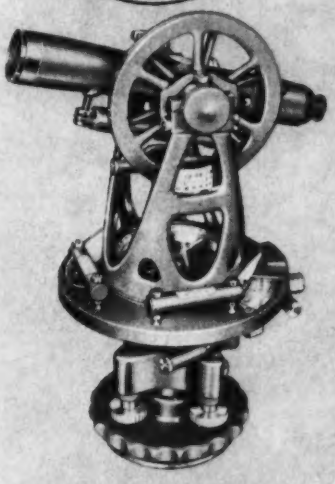

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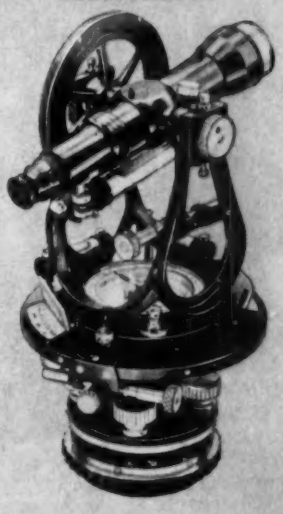

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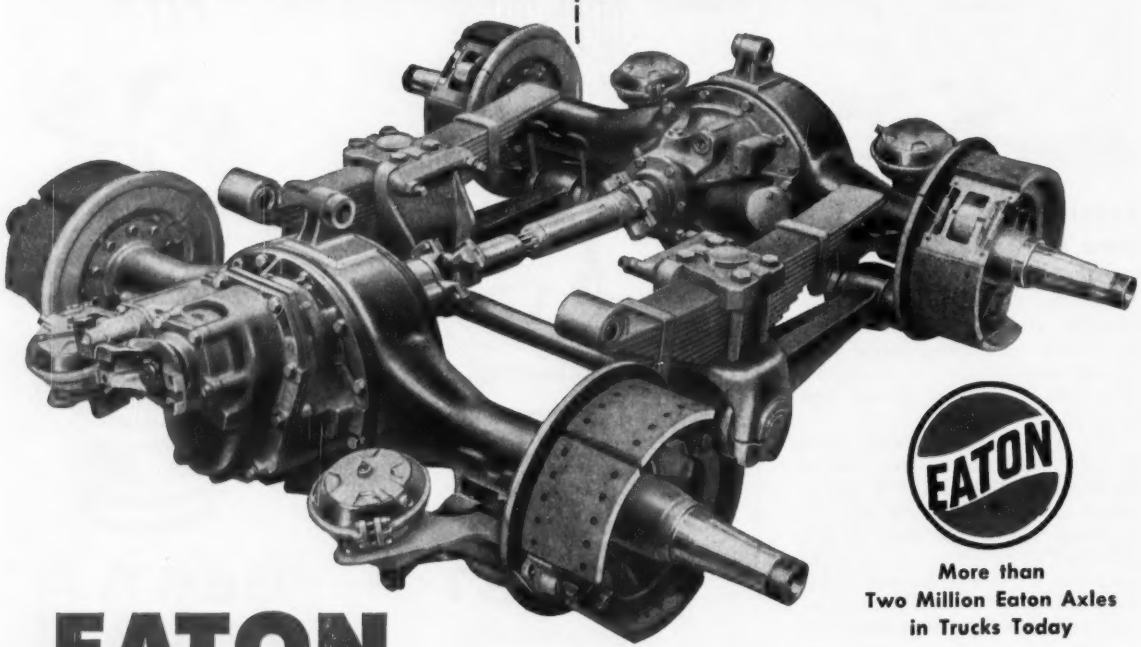

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Versatile Light Tractor

The Case W-3 tractor has a rear-mounted backhoe that digs to a depth of 14 ft and operates on a radius of 16 ft 9 in. The boom swings 180 deg and handles a variety of buckets.

The backhoe can be interchanged with a rear counterweight for loader operation. Other rear end attachments available for the unit include an all-purpose blade with scarifier, a post hole digger, and a rotary cutter. On the front end, it mounts a 15 cu ft loader bucket with a capacity of 2,500 lb.

A 47-hp Case gasoline engine powers the tractor through a torque converter drive. For highway travel, a lockout lever on the dash panel permits switching from torque converter to direct drive. Hydraulic power steering is standard.

A self-propelled scraper, first of its kind built by Case, also has been announced. The S-20 is the first and smallest unit of a scraper line that will range in size from 6½ yd to 18 yd heaped capacity.

Power train on the S-20 includes a Case 80-hp diesel engine, a torque converter, and an eight-speed transmission.—**J. I. Case Co., Racine, Wis.**

Small Seismograph Gathers Subsurface Information

Contractors can obtain earthwork cost estimates without drilling from subsurface data gathered with a small seismograph. The 16-lb electronic instrument determines the depth of bedrock and identifies other subsurface materials.

It takes two men to operate the instrument. A sledge hammer produces impulses that travel through the earth while the instrument measures the time required for the sound waves to reach rock. Depth and type of material are determined from the readings.—**Geophysical Specialties Co., 15409 Robinwood Dr., Hopkins, Minn.**

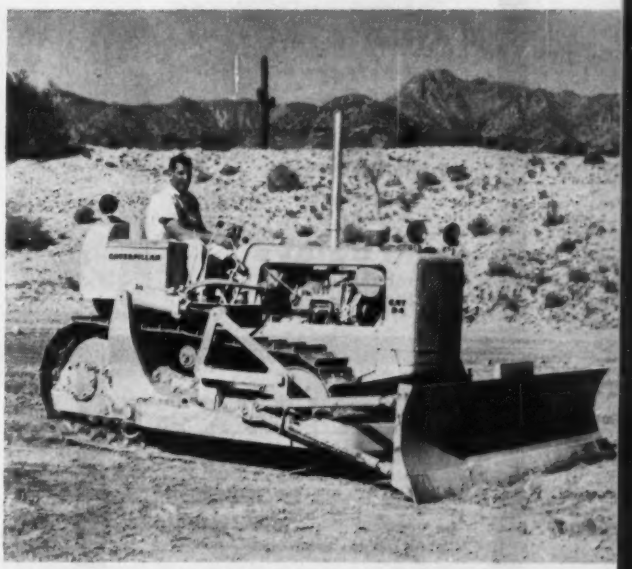
Improved Crawler Tractor

Several improvements have been incorporated into the new Caterpillar D4 Series C tractor. Its 4-cyl engine develops 52 drawbar hp giving the tractor a drawbar pull of 13,000 lb. With an optional lower speed transmission the maximum pull is 14,600 lb. The spur gear transmission has five speeds forward and four in reverse. The D4 is available with either 44 or 60-in. gage tracks.

The tractor's hydraulic control is adaptable to a variety of attachments. The standard unit has one valve and controls either a dozer blade, tool bar, or a rear implement. With two additional valves the control can handle one front-mounted and two rear-mounted or towed tools.

A 15-hp gasoline starting engine with a manual starter is standard. Optional starting systems include a 12-volt electric unit for the starting engine or a 24-volt direct starter for the diesel.

Another new tractor, the D6 Series B, also has been introduced. The engine develops 93 flywheel hp and is available with the same starting systems as the D4.—**Caterpillar Tractor Co., Peoria, Ill.**



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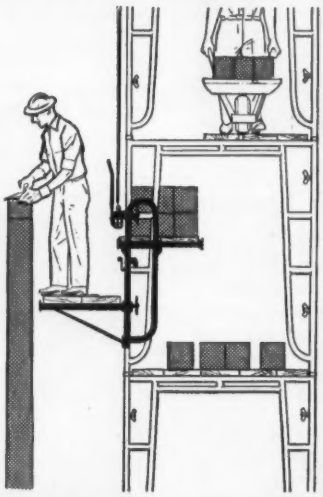

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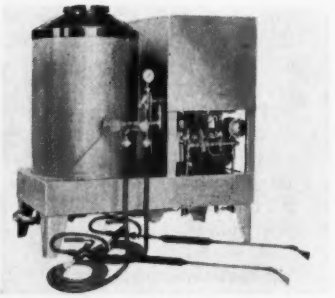

Gas-Fired Steam Cleaner

A large stationary steam cleaner delivers 330 gal of hot cleaning solution per hour at a pressure of 60 to 90 psi. It can supply solution to one or two nozzle-controlled guns that can work as far as 200 ft from the cleaner.

The solution tank of the Malsbary cleaner holds 60 gal, enough for 4 hr. of steady cleaning. The burner is adaptable to natural gas, butane, propane, or manufactured gas. The cleaner is 63 in. long, 36 in. wide, and 62 in. high; it weighs 1,200 lb.—**Malsbary Mfg., 845 92nd Ave., Oakland 3, California.**

Works All Day Without Shifting Gears

A full reversing transmission on this Allis-Chalmers loader lets the operator work all day without shifting gears. There is no clutch pedal—the operator simply pushes or pulls a single lever to control forward or reverse movement.

The TL-12 TractoLoader weighs 12,100 lb and has a breakout force of 13,200 lb. The 1⅛-yd bucket tips back 41 deg at carry height.

Power steering, four-wheel drive, and a hydraulic torque converter are standard. Maximum speed is 20 mph in forward and 25 mph in reverse. Either a 72.5-hp, 4-cyl A-C gasoline engine or a 77-hp, 6-cyl A-C diesel engine powers the loader.—**Allis-Chalmers Mfg. Co., Deerfield, Ill.**

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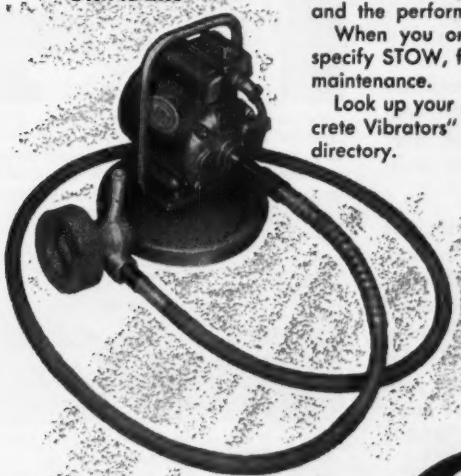

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Sliding gear transmission with torque converter gives operator smooth, infinite speed selection over 3 speed ranges, at up to 15 mph in both directions. Direction of travel and speed are both controlled by single combination lever for easier and more accurate shuttle rolling and control.

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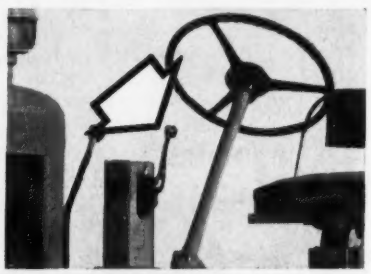

New forward-reverse throttle (arrow) gives operator instant one-lever control of direction and speed. Push forward for forward travel, pull back for reverse...that's all there's to it!

"Big brother" to the PSR-9, 7-wheel PSR-30 offers 10-30 ton compaction weight . . . speeds to 19.4 mph forward and reverse. Note how dual controls, plus special frame contour, give operator clear view of both guide and drive wheels on either side.

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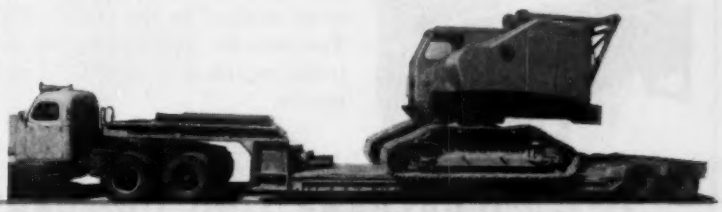

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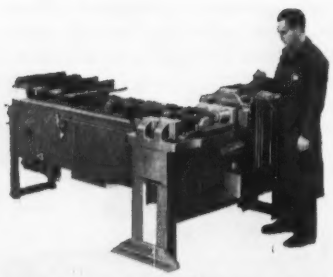

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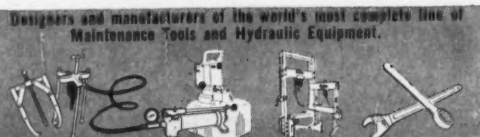

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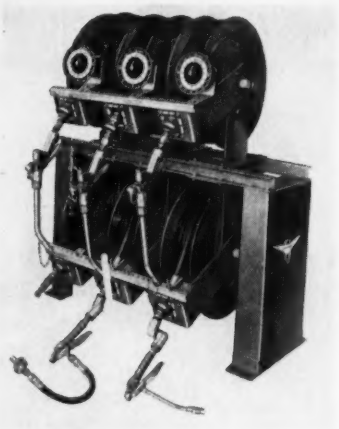

Lube Accessories

Reels, hoses, control valves, and pumps are included in the line of lube accessories for servicing equipment in the field manufactured by the Lincoln Engineering Co.

Lincoln Lubreels are spring-powered reel and hose assemblies that are automatically retracting. They are equipped with jam-proof latches that check the hose at any desired length and retract it with a slight additional pull.

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A steel support stand is available for mounting six reel and hose assemblies in a compact area. Three of these are mounted above and three below a horizontal cross member.

Control valves with a pistol grip dispense oils and lubricants in a continuous flow. A latch on the trigger locks it in the open position if desired.

A convenient method of centralized lubrication for any piece of equipment is offered by the Centr-O-Block system. It is a grease fitting manifold with six outlets connected to bearings by lubricant distribution lines.

A double-acting fluid dispensing pump operated by an air motor delivers 2/3 pint per cycle or 10 to 12 gpm with 50 psi of air pressures.

Another service accessory is an air-operated pump elevator. It is a lifting rig with a horizontal lift arm that can be raised

from 70½ in. to 108½ in. and swings 360 deg. It can be mounted on a lubricant truck for handling oil drums in the field or installed in the maintenance shop. The chain length and the lift arm are adjustable.—**Lincoln Engineering Co., 4010 Goodfellow Ave., St. Louis 20, Mo.**

Trailer Carries Eight Concrete Batches

A control panel inside the driver's cab controls all dumping on this eight-batch trailer. Hydraulic trippers, mounted on the side of the body, release the batches as needed.

The rear tandem is equipped with hydraulically operated leveling devices that prevent tipping when the body is in the raised position. The unit can be converted for materials hauling work when not in paving use.—**Galion Allsteel Body Co., Galion, Ohio.**

Utility Tractor

The Massey-Ferguson 65 utility tractor can handle a variety of matched attachments including a loader, backhoe, and a scarifier-scraper.

A 54.5-hp engine powers the tractor. It has six speeds forward and two in reverse. A two-stage clutch permits operation of the top when the tractor is not in motion. Power steering is standard equipment. — **Massey-Ferguson Industrial Div., Block 1000 S. West St., Wichita 13, Kan.**

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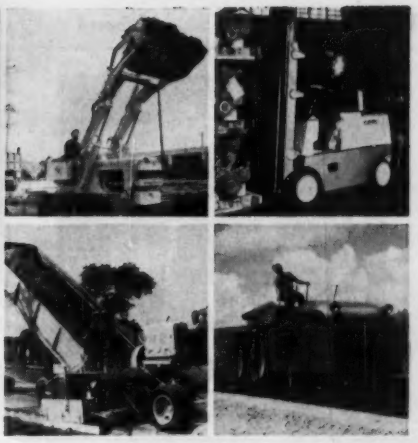

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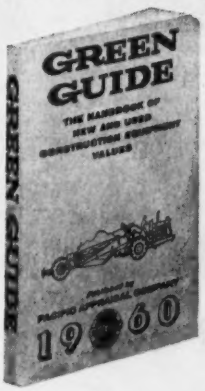

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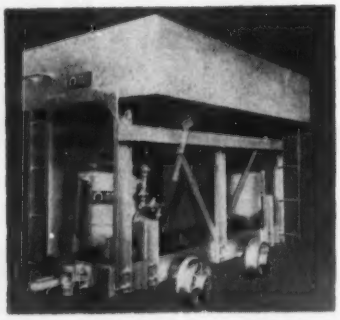
735 Industrial Road, San Carlos, California



Pea Shooter Car Hauls Gravel for Tunnel Work

A 4-cu yd car carries pea gravel for tunneling and injects it into the void around the tunnel liner plate. The car is loaded outside the tunnel and moved in behind the shield when needed. Then it is backed out and reloaded for the next trip.

Gravel flows by gravity from the hopper down into the two pea shooters on the car and is injected through hoses into the void. The car also can be converted to handle cement grout.—**Mayo Tunnel and Mine Equipment, Lancaster, Pa.**

FIRST IT WAS 4 PRIME-MOVERS

For the John Rohrer Construction Co., Kansas City

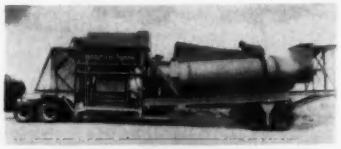
NOW IT'S 16 PRIME-MOVERS

This man is hauling 12 to 17 cubic yards of concrete an hour. PRIME-MOVERS are equally productive on brick handling.

Give your laborers the *POWER* to produce!

PRIME-MOVERS are one of the few powered tools engineered specifically for laborers' use — to triple the output on their primary function . . . handling materials! Here is an immediate and positive way to cut your costs . . . because **PRIME-MOVERS** are easy to put to use and simple to operate. No other phase of construction offers greater cost-cutting opportunities. Write today for job estimating data.

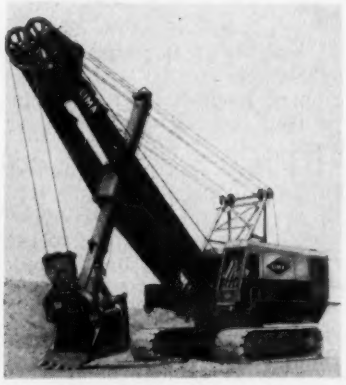
PRIME-MOVER CO. **PRIME-MOVER** MUSCATINE, IOWA



Portable Asphalt Plant

It takes 8 hr to erect the Standard TM-3000 portable asphalt plant. A built-in hoist raises the mixing unit into position at the touch of a button.

The trailer-mounted plant has a 3,000-lb batch capacity, and it can produce 120 tph. The plant includes push-button controls and drying and dust collecting units. —**Standard Steel Corp., P.O. Box 58252, Los Angeles 58, Calif.**



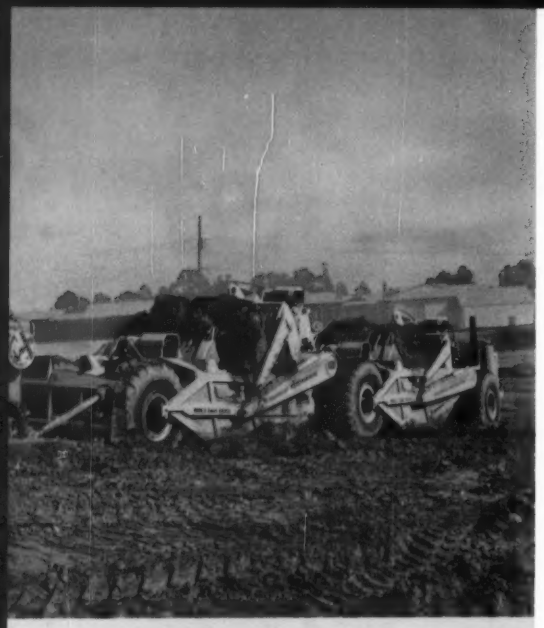
Big Capacity Shovel

Rigged as a standard shovel, the Lima 1800 is equipped with a 35-ft boom, a 26-ft 10-in. dipper handle, and a 5-yd dipper. As a crane, the crawler-mounted rig can lift 112 tons. A similar unit, the 1800SC, works as a 140-ton crawler crane.

Side frame assemblies including belts, crawler chains, and sprockets are removable for transportation. Counterweights are removable also. In addition, the gantry folds down to a height of 17 ft 5 in.

Both units are available with either deisel or electric power and are equipped with torque converter drives. The rigs are air operated.—**Construction Equipment Div., Baldwin-Lima-Hamilton Corp., Lima, Ohio.**

NOW
You haul
TWO LOADS
every trip
L.TOURNEAU WESTINGHOUSE
L.TOURNEAU WESTINGHOUSE
L.TOURNEAU
LW
WESTINGHOUSE
TANDEMS



TWO LOADS every trip...with LW TANDEM SCRAPERS

You save on investment: You double your load-capacity, but pay only for a second scraper and incidental hitch and installation. You save the price of a second prime-mover!

You save on operation: Your only additional operating cost for double-capacity LW Tandems is for a little more fuel per shift. One operator handles both scrapers!

You save on maintenance: Upkeep is only pennies-per-hour more than for a single scraper. You have six tires in place of four, but there is only one engine, one transmission, one final drive to care for.

This C-Tandem packs in 36 yards in 40 to 55 seconds for a California Contractor

This 270-hp C Tournapull® with tandem 18-yd C Fullpak® scrapers, moved an average of *36 yards per cycle* on a grading project at Pinole, California, for San Francisco Contractor Al Periera. With a 191-hp pusher, load times (to fill both scrapers with 18 yd each) averaged from 40 to 55 seconds.

Periera's C-Tandem kept pace with a single scraper C 'Pull* on the same job, negotiated 18% grades and averaged about 13 more gallons of fuel per shift than the single "C". It performed every standard maneuver, including full U-turns and full back-ups, with no tendency to jack-knife.

*Trademark

You need less pusher-power:

In LW Tandem operation, your pusher loads only one scraper at a time, so there's no need for a "super" pusher or for tandem pushers. You save *time*, too, because *one* tractor loads *two* scrapers in line . . . no time lost for repositioning.

Your haul roads last longer:

LW Tandems are no higher, and no wider, than single 'Pulls. They can use any haul road. With Tandem scrapers you use *fewer* machines, have less traffic congestion and delay. And ton-for-ton, there is less pounding of haul roads with Tandems than with single scrapers of equal capacity.

You get more adaptability:

You can meet changing job conditions by hitching or unhitching the Tandem scraper at will. And you can still interchange your basic scraper for a Rear-Dump, or other LW attachments, to spread your prime-mover investment over more jobs.

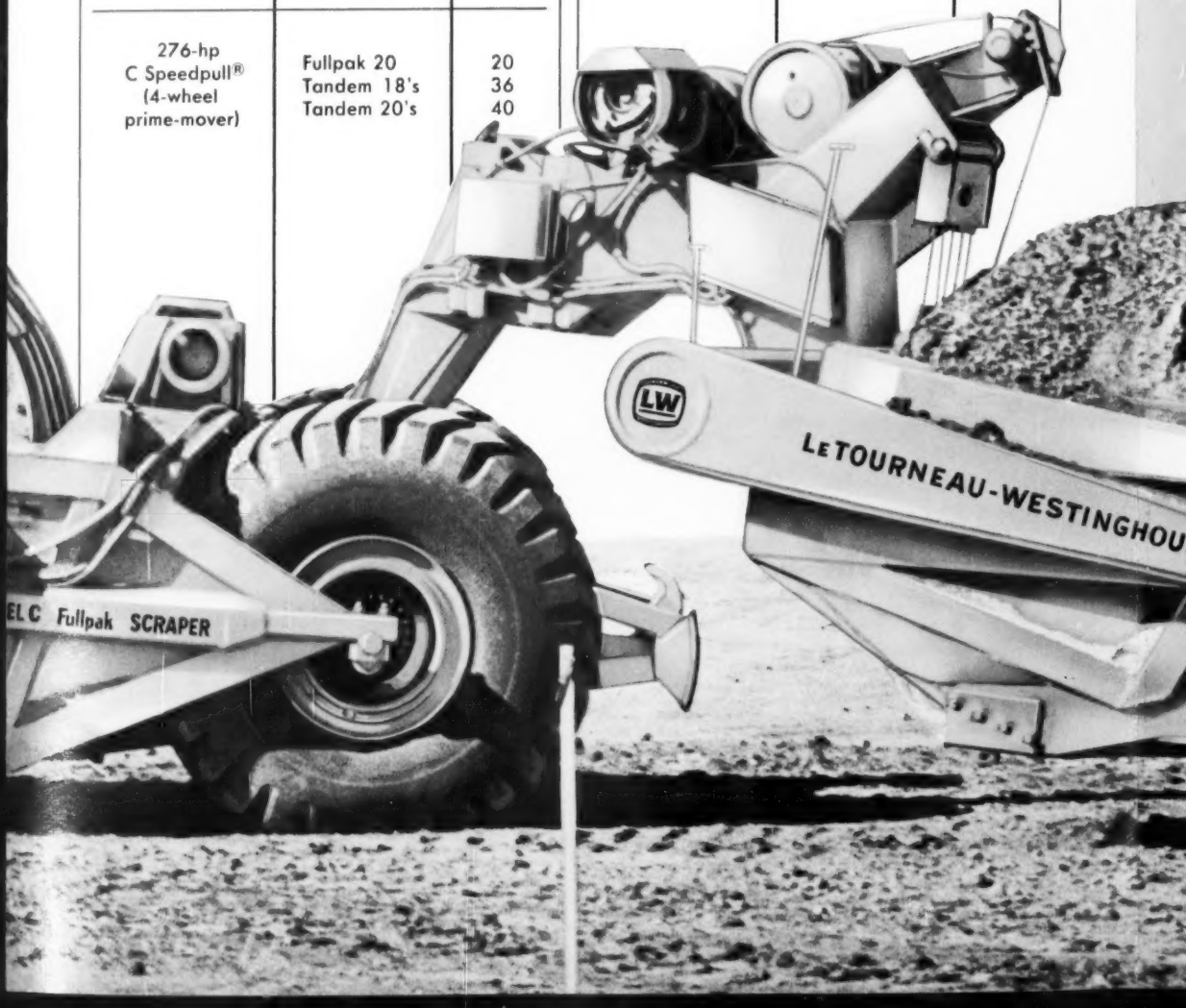
Use Tandem scrapers behind any 'Pull:

Choose from 9 to 56 cu yd capacity

You can pull and operate two scrapers with *any* LW electric-control 'Pull prime-mover. Here are *some* of the LW scraper combinations now available to move dirt at a *new* low in cost-per-yard:

PRIME-MOVERS	SCRAPERS	TOTAL HEAPED YARDS
143-hp D Tournapull	Model D	9
	Tandem D's	18
226-hp C Tournapull	Fullpak 18	18
	Tandem D's	18
270-hp V-Power C Tournapull	Fullpak 20	20
	Tandem 18's	36
	Tandem 20's	40
276-hp C Speedpull® (4-wheel prime-mover)	Fullpak 20	20
	Tandem 18's	36
	Tandem 20's	40

PRIME-MOVERS	SCRAPERS	TOTAL HEAPED YARDS
335-hp B Tournapull	B Fullpak	28
	Tandem 18's	36
	Tandem 20's	40
360-hp B Tournapull	B Fullpak	28
	Tandem 18's	36
	Tandem 20's	40
	Tandem B's	56



Where LW Tandems pay off best

1. *Use LW Tandems* where the combined rolling and grade resistance of haul roads is 60 lb per ton or less on the loaded haul, or 120 lb per ton maximum on return routes.
2. *Use LW Tandems* on short hauls where you cannot take full advantage of single scraper speed.
3. *Use LW Tandems* in tough loading. Where your present pusher may not be able to load a 28-yard scraper, for example, it can *easily* load two 20-yard scrapers *in tandem.*

In general, use LW Tandems wherever and whenever you do not NEED, or cannot take ADVANTAGE of, the full power and speed of single scrapers. You will find that many of your jobs fit that description . . . where LW TANDEMS PAY OFF BIG!

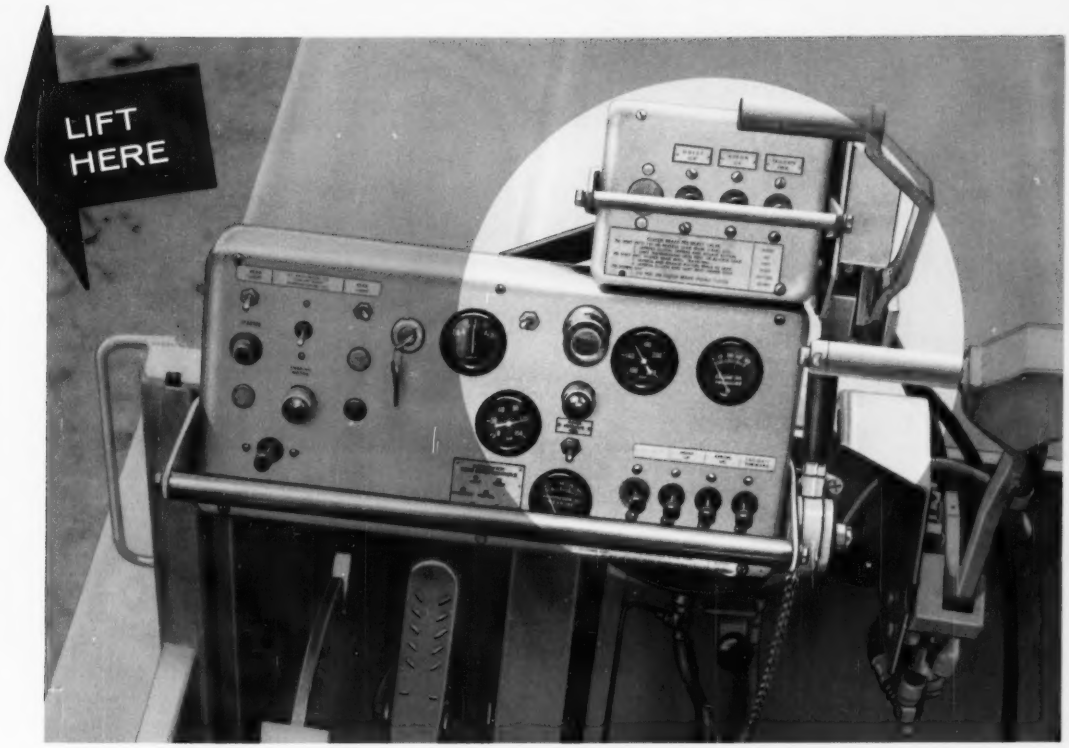
Your LW Distributor can convert your *present* 'Pulls to tandem operation, or equip you with new, 1960 'Pulls with tandem connections already installed. He can also give you reliable engineering data that will show you on what job conditions you'll make *most* money with LW Tandems. He can show you full-color motion pictures of LW Tandems at work on jobs very similar to *yours.* You can see for yourself how these revolutionary LW Tandems can increase your profits. See your LW Distributor *soon.*

LW Tandem Hitch...big, simple, rugged: permits single-scraper maneuverability

This universal-swivel hitch securely connects the front scraper to the rear scraper in LW Tandems. The plate and hitch are welded to top members of the push-block frame of the front scraper, which are reinforced with high-strength steel channels. Its pivot-point is over the rear-axle of the front scraper. Electric and air lines "plug in" to simple, quick disconnects at the hitch.

This hook-up of scrapers is so simple that, once installed, you can add the extra scraper or take it off in less than half an hour.

The tandem hitch permits complete maneuverability. You can back up, turn in any direction, and perform any other maneuver that is possible with single scrapers. And there is never a tendency to jack-knife! 180° tandem turns are made in an area only 20 to 25% wider than is required for single self-propelled scrapers.



LW ELECTRIC CONTROL

provides the means for practical tandems

This is the control panel of a 'Pull Tandem. Its fingertip buttons control bowl-lift, apron, and tailgate... bottom row for the front scraper, top row for the rear scraper. By the simple action of moving a button, a circuit closes and transmits electric work-power instantly along flexible copper wires, to the desired control motor at point-of-action.

It is this unique 'Pull feature that makes possible the practical operation of a second scraper. Unlike mechanical or hydraulic power, electricity can be sent any distance, in any direction, along small-diameter, flexible wires. The power so transmitted arrives at its point-of-work in a split-second. No extra power source is needed.

Making tandem operation *practical* is only one of the remarkable advantages of LW "electrics." It gives immediate response — in 3/5ths of a second. It is easiest to operate — your operator merely moves buttons! It is completely weatherproof. No other control system can be maintained at full efficiency for less money and with less attention.

For most profitable use of 'Pull Tandems, maintain job-sites with fast LW "work-tools"

With the tremendous pay-loads you can pack into LW Tandems, you'll want more than ever to keep your haul-roads, cuts, and fills well-maintained. You'll handle this important job easiest and at least cost with these fast-working LW machines:

C TOURNATRACTOR®:

Use it to speed haul-road construction, cut-and-fill maintenance, and dozens of other tractor jobs all over your spread. With 17-mph speed and instant-shift, Tournatractor *gets* to a job faster, *works* faster. And you can use its 218 hp to push-load scrapers, *even Tandem C's!* Popular on big jobs for towing sheepsfoot rollers.

LW MOTOR GRADER:

Fastest grader built, with 26.7 mph top speed, and higher working speeds gear-for-gear than any other make. One-piece frame for extreme ruggedness; big 63″ circle, for accurate blade control; full view visibility, so operator can see both ends of blade as well as the road ahead. Seven models, to 190 hp, including two POWER-*Flow*® models with torque converters. Standard models offer 8 forward speeds, 4 reverse and 3 optional creeper gears.

Set a New Standard for the Sixties with LW SPEED Equipment

Now is the time to check with your LW Distributor. He can give you full details on the revolutionary new LW Tandems, and will be proud to show you the full line of LW *SPEED* earthmoving equipment for 1960. Every machine in the line is as fast or faster than any similar piece of equipment on the market. LeTourneau-Westinghouse long ago mastered *quality* and *dependability*. Its leadership in these values is an accepted fact all over the world. And now LW has added a new standard of SPEED and CAPACITY in earthmoving equipment, because in today's era of tight profit-margins, only by moving more dirt in less time can you achieve *lowest-net-cost-per-yard* and its resulting profits.

Only LW offers you proven equipment in all four basic types of rubber-tired earthmoving machines: scrapers, tractors, graders, and off-highway trucks. See your LW Distributor SOON!

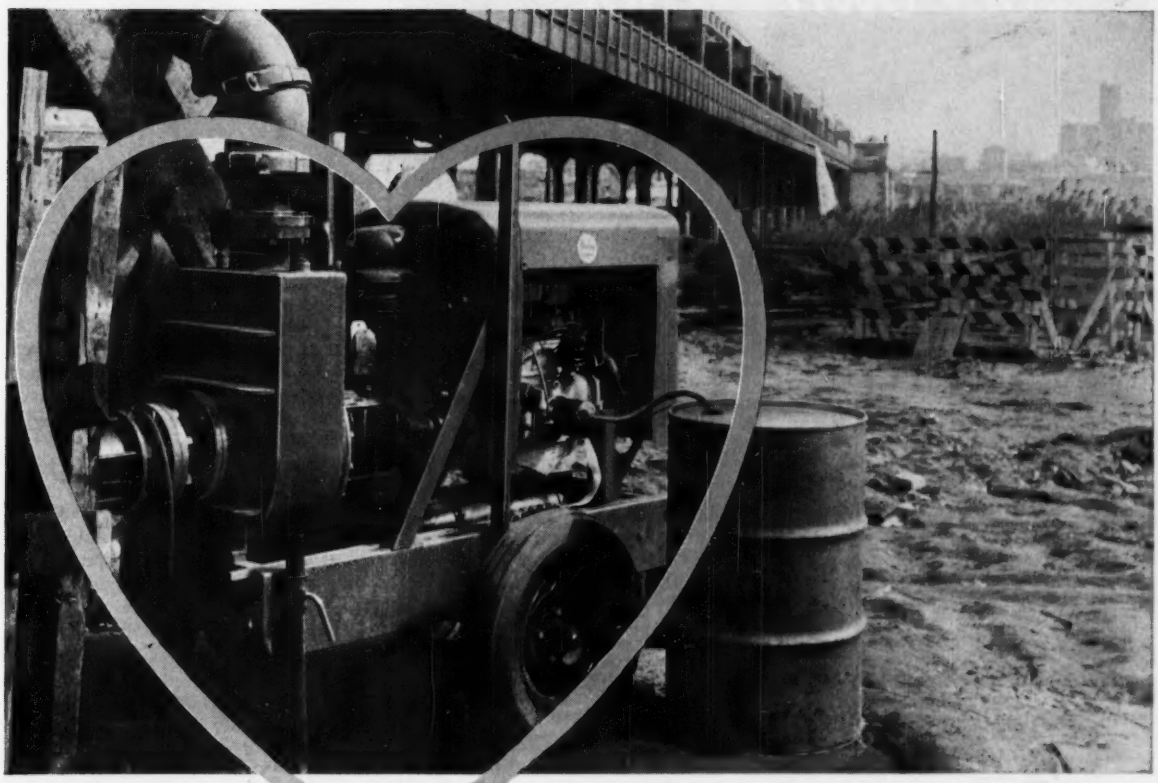
LeTOURNEAU-WESTINGHOUSE COMPANY
PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company
Where quality is a habit

Litho in U.S.A.

TP-2260-DC-8

ABRASIVE, FLY-ASH-LADEN WATER

no problem for a MARLOW!



The **HEART** *of any solution*
to seepage water **IS THE PUMP ON THE JOB!**

The Roosevelt Avenue Bridge, over the Flushing River in Flushing, New York, carries trains of the city's transit system, as well as heavy highway traffic. Recently, it was noticed that the structure was sinking, endangering both highway and train travel. To correct this, a contract was issued by the Department of Public Works of the City of New York to the Woodcrest Construction Company for the reconstruction of the West approach to the bridge.

When the two-decked structure was originally built, it used wood piles sunk 70 feet below grade. As the ground on the site is mostly filled with fly-ash from incinerators, new steel piles were driven to between 100 and 120 feet below grade to properly support the new bridge abutments.

Seepage from the nearby river became a very serious problem when digging excavations for the abutments. In addition, the abrasive nature of the fly-ash fill could cause trouble to the pumps. To solve *both* problems, Ed Good, General Superintendent for Woodcrest, set up a 6E4 Marlow Contractors Pump. Running six hours a day, this 90,000 GPH, self-primer, sold by Foundation Equipment Co., completely controlled the onrushing water. The 360° cleaning action of the Marlow kept the casing clean and, because there were no close clearances in the pump to wear, the abrasive liquid caused no trouble in the units. Ed Good had used Marlows for some time and *knew* they would perform without trouble.

Marlows can help solve your construction pumping problems. There's a unit from Marlow's complete line of self-priming and diaphragm pumps that's just right for your job. Write today for the name of your Marlow dealer and a copy of Marlow Contractor Pumps Bulletin C-09.

Marlow PUMPS

MARLOW PUMPS
DIVISION OF BELL & GOSSETT COMPANY
MIDLAND PARK, NEW JERSEY
Morton Grove, Illinois • Longview, Texas

B-473

White L-20 ASPHALT PLANT

SAVE $2.00 A TON

Make your own hot mix asphalt with this new WHITE plant and save about $2.00 a ton. At its capacity of 240 tons a day, that's savings of $480.00 a day. Thirty-one of those days pay for the L-20!

Produces any type mix you can get from a $100,000 plant: AC, RC, MC, SC and emulsified for top course, base course, one course, or patch. Two men operate. Capacity is rated at a hot 315 degrees.

Available either portable or stationary, the L-20 will supply black-top for suburban streets, driveways, parking lots, school yards, or state highway maintenance. See nearest White distributor or mail coupon.

TAR KETTLES

TROWELERS

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Manufacturers of quality construction equipment since 1925.

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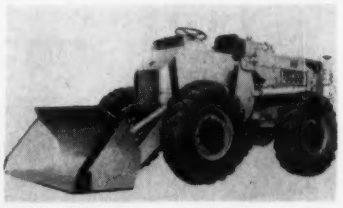


Tractor Shovel Offers Two Types of Engines

Either gasoline or diesel power is available for the Nelson 150 tractor shovel. Both the 107-hp gasoline and the 85-hp diesel engines are Hercules made.

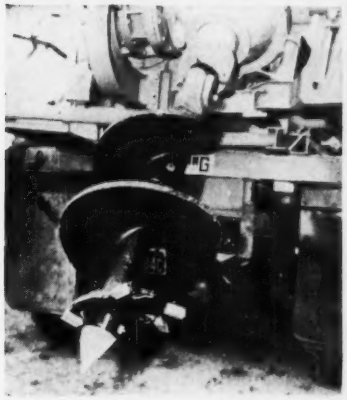
Bucket capacity is 1⅝ yd with a dumping height of 9 ft and a forward reach of 7 ft. The bucket tips back 40 deg at ground level. The unit weighs 15,900 lb with the diesel engine.

Standard equipment includes an Allison transmission with three-speeds in both forward and reverse and four-wheel drive planetary axles with torque proportioning differentials. Maximum speed is 27 mph.—**N. P. Nelson Iron Works, Inc., 850 Bloomfield Ave., Clifton, N.J.**

Loader Attachment Fits Cat Motor Graders

A front-mounted, 1-yd loader attachment built by Martin Co. is available for Caterpillar motor graders. The GraderloadeR is installed on special mountings attached to the grader. Two bolts and a pin secure the unit to the grader frame without interfering with other grader operations. The bucket dumping height is 11 ft.

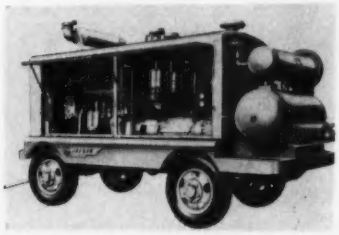
A two-level hydraulic control valve installed at the side of the grader panel permits one-hand operation of the attachment. A Vickers hydraulic pump mounted at the rear of the engine crankshaft powers the hydraulic system. — **Martin Co., 620 Andrews Ave., Kewanee, Ill.**



Auger Digs Tough Materials

The PolerBore auger has a strong penetrator point and two flights with strategically placed teeth that produce a graduated cutting action. This permits the auger to work in shale, sandstone, frost, or stony ground.

Available sizes range from 10 to 36 in. in diameter; larger sizes are optional. The type of earth boring machine used determines the depth that the auger can reach. It can also work horizontally. The entire attachment consists of only three parts: the auger, penetrator point, and cutting teeth.—**Trainer Associates, Inc., New Castle, Del.**



Portable Compressor Delivers High Output

A Jaeger rotary air compressor delivers 900 cfm but operates at a speed of only 1,700 rpm. A GM diesel engine whose full load speed is 1,800 rpm powers the unit. A reduction of 100 rpm in engine speed is said to increase fuel economy considerably and to decrease wear on the components.

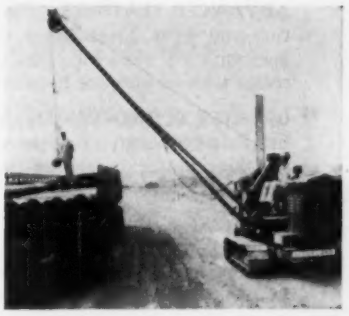
Automatic regulation of engine and compressor maintains a minimum air pressure of 100 psi. Standard equipment includes an automatic blow-down valve, check valve, oil cooler, hour meter, and adjustable radiator shutters. — **The Jaeger Machine Co., Columbus 16, Ohio.**

Cleveland 80W lays pipe for 13-mile sewer line—does backfilling, too

G. C. McLeod Co. of Edmonton, Alberta made extensive use of its Cleveland 80W for laying 20" and 8" asbestos pipe on a 69,000-foot sanitary sewer line in Nanaimo, B. C. Even in the extremely wet and heavy mud of the salt water tidelands shown above, construction moved ahead 800—1,300 feet daily. As the line progressed into drier ground, the 80W was further employed in backfilling and cleanup operations.

THE ONE-MAN-OPERATED 80W

- **DOES SIDEBOOM WORK OF ALL KINDS,** unloads, strings, lays pipe, sets valves, hydrants, etc.
- **BACKFILLS SPOIL** clean and fast from *either* side of trench.
- **TAMPS SPOIL** simultaneously with pull-backfilling, or separately, as required.



Check with your distributor now—get the complete 80W story

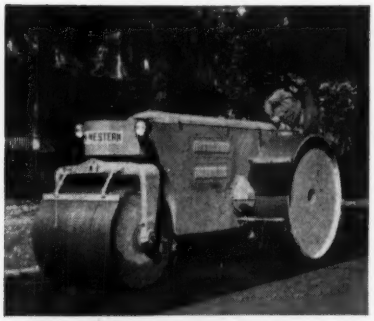
The CLEVELAND TRENCHER Co.

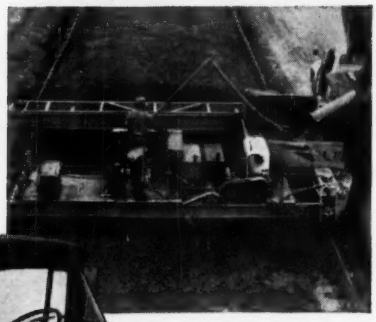
20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO

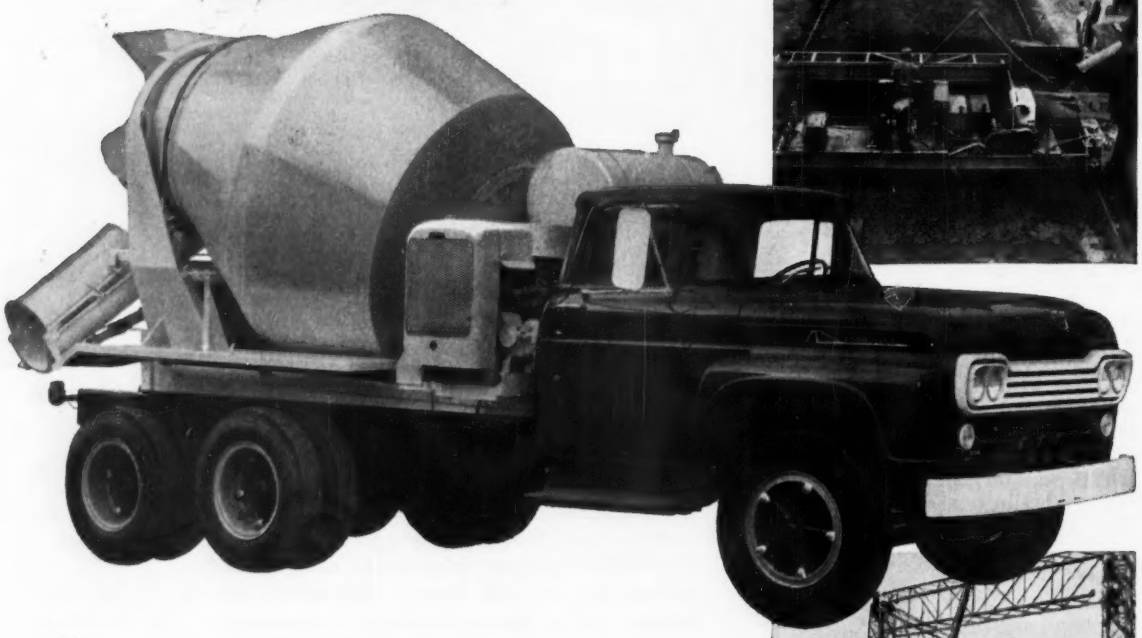
Good Everywhere

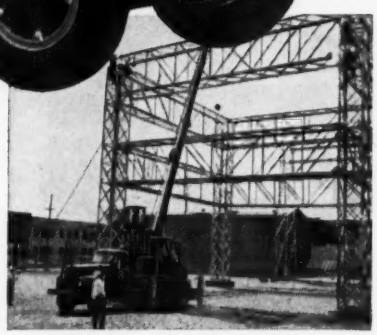
In the ready-mix and construction industries THE SWING IS TO

Ford
INDUSTRIAL ENGINES









More and more construction projects are being powered with dependable Ford Industrial Engines every day. Here's why:

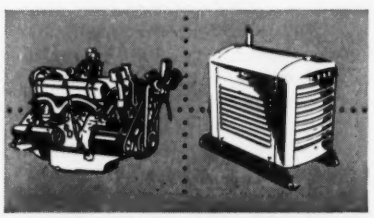
ADVANCED FEATURES—Ford's Short Stroke design reduces friction and wear. Deep-Block construction provides smooth engine performance. *And all Ford engines offer higher power-to-weight ratios than ever before possible!*

GREATER ECONOMY—Overhead valve construction throughout Ford's entire engine line permits higher engine compression ratios, provides better breathing for greater power output, and makes servicing easier, quicker and less costly.

PARTS AND SERVICE—Ford's world-wide dealer network (over 10,000 Ford Dealerships in the U.S. alone) offers prompt, efficient service *wherever you go.* For these and many other reasons, you'll find that Ford power is *right* for your construction equipment, too!

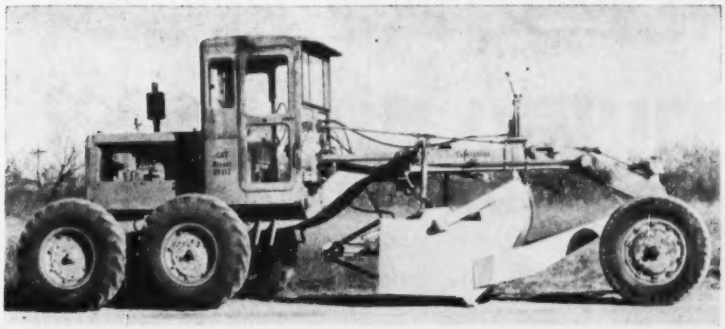
Visit the Ford Motor Company Display
at the Sand and Gravel Show . . . Feb. 15 to 18 . . .
at the Chicago Coliseum—Booths 16 and 17

More power to you . . .



INDUSTRIAL ENGINE DEPARTMENT, FORD DIVISION, FORD MOTOR CO., P.O. BOX 598, DEARBORN, MICH.

West of Rockies write to:
→ FORD INDUSTRIAL ENGINE DEPT., P.O. BOX 6787, LOS ANGELES 22, CALIF.
→ FORD INDUSTRIAL ENGINE DEPT., P.O. BOX 1666, RICHMOND, CALIF.



Scraper Attachment Fits Motor Graders

A scraper attachment for Caterpillar motor graders can carry 3½ yd of dirt. The 9½-ft-wide GraderscrapeR is mounted in place of the grader's blade and circle.

Standard grader controls operate the scraper; circle lift arms control the vertical motion while side shift controls move the scraper to either side. A special hydraulic system at the rear of the grader engine controls dumping and apron opening.

The GraderscrapeR can be tilted 17 deg to either side while the grader remains level. The scraper can be shifted to either side of the machine to cut 6 in. beyond the grader's wheels. The unit's road clearance is 11 in. and it can carry a full load at highway speed. The apron opening is 19½ in., and the scraper is equipped with a hydraulic ejection system. — **Martin Co., 620 Andrews Ave. Kewanee, Ill.**

Big Tractor Shovel

The PM-440 is the largest Speedall tractor shovel built by Pettibone Mulliken. It can lift 21,000 lb and has a breakout force of 24,800 lb. Bucket sizes range from 3 to 4¼ yd. The bucket tips back 40 deg at ground level and has a maximum dumping height of 9 ft.

Either a 152-hp GM diesel or a 175-hp Cummins diesel engine power the unit. Standard equipment includes a power shift transmission, torque converter, hydraulic power-assist brakes and steering, four-wheel drive, and an automatic bucket leveler.— **Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill.**

Concrete mix would grind the markings off most tapes!

This is Lufkin's Mezurall® tape . . . with unmatched Chrome Clad® blade that fights concrete, sand, mud and other abrasives.

Lufkin starts with a special tempered steel . . . bonds the markings to it. Then layer after layer of electroplating is applied, topped by a final layer of tough chrome. There's no other blade like it. Comes in 6′, 8′, 10′ and 12′ lengths . . . either ½″ or ¾″ widths. The Lufkin Rule Company, Saginaw, Mich.

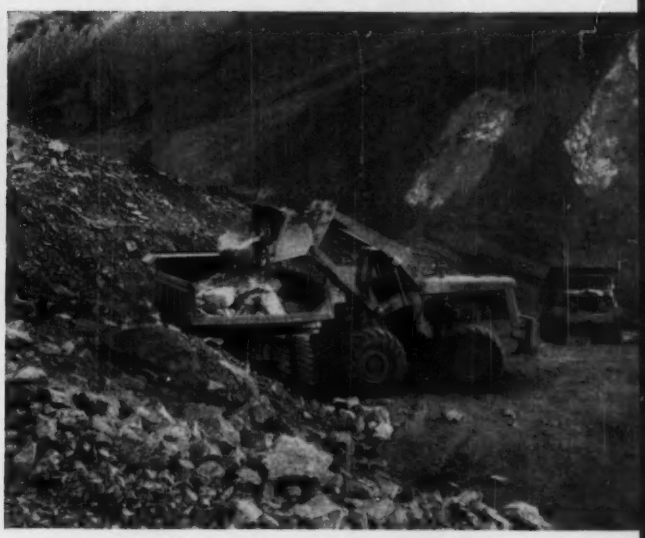
THE LUFKIN RULE COMPANY
TAPES • RULES • PRECISION TOOLS

Earthquake dumps 43 million yds of rock into canyon, creates 300 ft dam in minutes

It was the evening of August 17, 1959. The beautiful and serene Madison River Canyon area near Yellowstone Park was settling down for the night. Campers in their sleeping bags, a few cars still on the highway . . . then, at 11:38 pm, a tremor! Then a rumble! Then a 7,000 ft mountain split in two! Over 85 million tons of rock, dirt and trees cascaded down. In a few minutes a 300 ft high earthen dam had been "built" across the canyon. Beneath it lay a public camp ground, a mile of Montana highway, and nobody yet knows just what else. It was the fourth largest earthquake ever recorded in United States history. Over 550,000 square miles had been affected. The immediate problem was rescue work. Then came an even rougher job: control of the water building up behind the natural dam structure.

4½ yd Tractor Shovel loads 5,500 tons per day to shape nature's work

Michigan 4½ yd Model 275A does typical swing shovel work, loads ten to fifteen 27-yd trucks per hour.



Taking 6-ton bites, the 4½ yd Tractor Shovel loads a truck in 3 to 4 passes. Production: 250 tons per hour.

The "quake," it turned out, had deposited *43 million yards* of dirt and rock across the valley. To curtail flood danger, at least 2 million yards of this would have to be moved. Time was at a premium. Work had to be completed before the severe winter set in and spring thaws and rains came.

The first phase was to level the slide's uneven crest and build a spillway to guide the water back into its natural channel. This involved moving a million yards of material. Work progressed rapidly for a few weeks until, suddenly, the five-mile-long backwater lake topped the slide crest. It was almost a second disaster! The rushing water created 15 to 20 ft erosion channels from the top of the "dam," down the unfinished spillway to the toe of the slide.

4½ and 6 yd Tractor Shovels do swing shovel work

A stilling basin had to be built in a hurry to slow down the wild water and re-direct it into the old river channel. Another million yards of rock had to be moved. More equipment was called for by the directing agency, the Army Corps of Engineers. Now, 61 pieces of heavy earthmovers and trucks were on the job. Included were four large-capacity, 4½ and 6 yd Michigan Tractor Shovels. *Their mobility, and the ability to perform a task formerly considered strictly in the realm of swing shovels turned the tide.* The Michigans worked continually in rock, loading from narrow ledges on the unstable face of the slide.

One Michigan keeps 10 to 15 trucks busy

Zook Brothers Construction Company, of Big Fork, Montana, was one of the major contractors using a Michigan. Working two 11-hour shifts a day, seven days a week, their 4½ yd Model 275A loaded out an average of 5,500 tons of rock per day from a work area located near the bottom of the slide and flush with the mountain from which the rock fell. Ten to fifteen 27 yd rear-dumps carried the Tractor Shovel's production down a long winding access road to the basin area for spreading.

3 to 4 passes load each truck

In the bigger rock chunks, up to 1¼ yds per chunk, the Michigan loaded an average of 10 haul units per hour. Loads ranged from 15 to 17 yards each. In smaller rock, an average of 15 rear-dumps were loaded per hour. Material was heavy . . . about 4500 lbs per solid yard overall. Glenn Zook, partner of the firm, said, "The Michigan's digging ability and bucket action let us heap-load. We got good production every hour of the job."

We'll demonstrate

Perhaps you could use Michigan Tractor Shovel stamina, capacity and rock-loading ability to increase efficiency *on your job*. There are nine Michigan models to choose from—16 cu ft to 6 cu yds, 3,000 to 30,000 lb lift capacities. We'll be glad to give you a "no obligation" demonstration.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

2403 Pipestone Road
Benton Harbor 12, Michigan

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

NEW ROCK LOADING TEAM

Hauler: 13-ton Michigan Tractor Wagon
Loader: 2¾ yd Michigan Tractor Shovel
Output: 2,400 tons daily on 2-mile cycle

Four years ago, the Fort Scott Hydraulic Cement Company, Fort Scott, Kansas began a program to replace their four crawler-loaders and two 10-ton tandem-axle dump trucks with the most modern equipment available.

The program was completed when a 13-ton rear-dump Michigan Tractor Wagon went on the job a year ago. Its addition gave Fort Scott, one of the nation's three major natural cement producers, an all Michigan fleet. The Wagon teams with a 2¼ yd Model 175A Michigan Tractor Shovel in the rock pit. Three other 2¼ yd Michigan Tractor Shovels handle the crushed rock, coal, and clinkers in this 4,500 barrel-a-day natural cement plant.

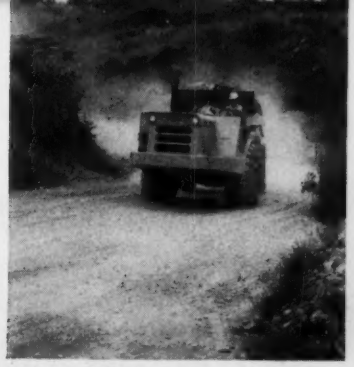
Tractor Wagon hauls 120 tons per hour

It's the heavy rock loading and hauling operation that Mr. Pat Thomas, president of the 92-year-old firm, points to as being the best example of how the Michigan machines have improved job efficiency.

Shot Florentine limestone is currently being loaded out of the far end of a pit 90 feet wide and 5,000 to 6,000 feet long. This makes the average haul cycle, between pit and crusher, about two miles.

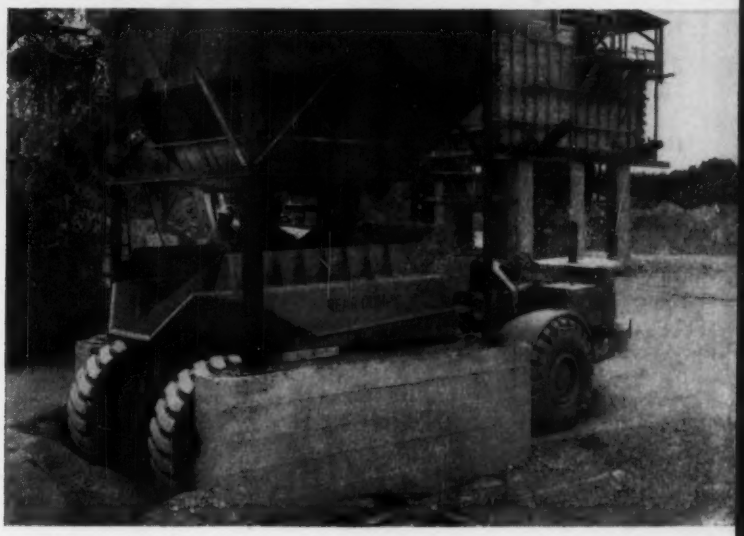
The 162 hp Tractor Wagon's stability and speed of up to 31 mph is a prime production factor in the mile long *uphill* run from pit to crusher. With torque converter and full power shift, power and speed are instantly adjusted to match the load demand.

On two 10-hour shifts, the Tractor Wagon, sideboarded to meet rated ca-



Michigan 162 hp Tractor Wagon, with torque converter and power shift providing top speed, barrels uphill to plant.

With hydraulic rear dump, Michigan unloads fast. Quick-interchange feature, Wagon for 10½ yd Scraper, provides added versatility.



In spare time, 13 ton Tractor Wagon takes crushed stone from hopper to stockpile.

BOOSTS PRODUCTION 25%

pacity, and the highly-maneuverable 2¼ yd Tractor Shovel will load out an average 2,400 tons of rock . . . rock which weighs, when loose, approximately 2,500 lbs per cu yd.

2 Michigans outwork 3 units formerly used

Production in the rock pit has risen 25% since the Tractor Shovel replaced a crawler rig with similar bucket capacity, and the Tractor Wagon took over the job formerly handled by two 10-ton dump trucks.

When maximum production from the crusher is not a factor, the Tractor Wagon is taken off the shot rock haul and used by itself to build up the crushed rock stockpile, an operation previously handled by two to four random-sized dump trucks.

Compaction has reduced haul road maintenance

An added advantage, according to Mr. Thomas, is the Michigans' compacting action on the haul roads. The 31,500 lb (plus load) Model 110 Tractor Wagon and the 29,000 lb Tractor Shovels have reduced maintenance and actually improved haul road conditions as they travel between pit and plant.

Upkeep "phenomenally small," says president

"With all five of the Michigans working constantly with heavy loads and over sharp rock and abrasive cinders, *we have spent less than $2100 on overhauls, parts, tires and labor during the past three years*," says Mr. Thomas. "I think this figure is extremely low considering what a machine goes through in a cement plant operation of this type. We have had virtually no downtime."

If you're hauling bulky materials off the highway, perhaps a Michigan Tractor Wagon could increase your production, too. When you pair it with one of the eight Michigan Tractor Shovel models (up to 6 cu yds), you've got a team that can't be beat. Let us demonmonstrate. Just call. There's no obligation, of course.

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600 hp Michigan replaces tandem-pushers on Hugh Steele Inc. highway job

Earns $126 extra

"Earning their keep!?! Why, in a year, I could run them into the middle of the Chattahoochee River, and still walk away with a profit!"

Hugh Steele is talking about three rubber-tired Michigan Dozers that are making their mark in big, bold dollar signs all around his 18.1 mile highway contract near Ashburn, Georgia.

Biggest profit producer is in the cut. It's a *600 hp* Michigan Model 480! This big rig started out in demonstration against two 190-hp crawlers push-loading in tandem. The results were so one-sided Mr. Steele wouldn't let Atlanta distributor Stith Equipment Co. take the Michigan off his job.

Scales, stop watch tell the story: 14 more loads per hour

With scales and stop watches, this production story was recorded:

Material	Model 480 Sandy clay (3000 lbs/yd)	Tandem Crawlers Sandy clay (3000 lbs/yd)
Scraper capacity (each of 12 machines)	25 yds heaped	25 yds heaped
Average load time	30 seconds	44 seconds
Pusher cycle time	60 seconds	84 seconds
Average payload, scale weighed	60,000 lbs	48,600 lbs
Average pay yds	20.0	16.2
Scraper loads per 50-min hr.	50.0	35.7
Scraper output per 50-min hr.	1,000.0 yds	578.3 yds

In terms of cold cash, these figures mean simply that the Michigan *earns more dollars per hour*. A lot more! In 30c dirt, its *extra earnings* average *$126 per hour* over tandem pushers, according to Mr Steele.

Faster pushing nets bigger pay loads

Watch a few push-loading cycles and you'll see why. The Model 480 has half again as much power as the two crawler-pushers *combined*. It backs up faster than crawlers, and being one machine instead of two, naturally positions faster (24 seconds faster, on the

Biggest Michigan of all, this 600 hp Model 480, does more work than two big crawlers combined.

Steele's two 262 hp Model 280 Michigans spread and compact 20,000 yds of fill a day. In "spare" time, units also handle such scattered odd jobs as dressing stockpiles (below), towing disabled vehicles, backfilling around culverts.

per hour

average, on this job). It pushes faster (at speeds up to 5 mph), which both reduces load time and keeps the dirt more "alive." Result: higher, tighter, bigger loads—and more of them.

Other Michigans save time on fill-compaction assignment

Just as the big Model 480 is producing profits in the cut, so too are two other Michigan Dozers saving money for Owner Steele on the fill. These units are both 262 hp Model 280's. They are spreading fill and compacting . . . achieving specified 95% Proctor in two to three high-speed (7½ mph) passes.

Speed scattered odd jobs

And that's not all. Go-anywhere 28 mph mobility allows the Michigans to sneak away from main assignments to tackle emergency jobs. Towing disabled vehicles, for example. Back-filling around culverts. Building up low spots in haul roads.

These are just a few of the odd jobs. *But the real advantage of Michigan Dozers,* Mr. Steele says, *is their ability to outperform crawlers on many production jobs too.* And do it day after day, with dependability equal to that of Michigan Tractor Shovels. There are four size Dozers to choose from: 162, 262, 375, and 600 hp. Your Michigan Distributor will be glad to show you one in action so you can judge its advantages for yourself.

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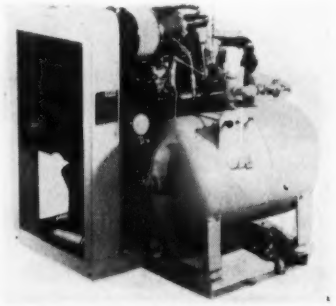
Dustless Drill

A drilling and dust collecting system mounted on the LeRoi Tractair speeds up street undersealing and mud jacking and eliminates concrete dust.

The drill is mounted on a reverse feed mechanism and a column supporting arrangement. It has a 36-in. feed. A suction cup that fits around the drill steel traps the dust and cuttings; a hose carries them to a dust collecting tank. The Tractair operator can control drilling from the driver's seat.—**Le Roi Div., Westinghouse Air Brake Co., Milwaukee 1, Wisconsin.**



Unit Is Half Engine, Half Air Compressor

A fourcylinder Willys industrial engine has been converted into the GS260 air compressor by General Supply Co. Two of the engine's cylinders supply the power, the other two compress the air. The engine develops 30 hp.

Capacity of the compressed air tank is 85 cu ft. It can be pumped

up from 0 to 130 lb in 17 seconds. The air supply is sufficient to power two air tools and inflate tire simultaneously. The unit is designed for installation in trucks and draws from the gasoline tank and battery of the truck. Mobile or stationary units are also available.

A larger Chrysler industrial engine has also been converted into a similar compressor. Three cylinders supply the power; the other three compress the air.

The Porta-Air 75 delivers 75 cfm at 100 psi. It will operate one 45-lb rock drill or one 80-lb pavement breaker. This unit consumes 1½ gal of fuel per hr and is equipped with a 13-gal gas tank and a 12-volt electrical system. Skid-mounted or trailer-mounted units are available.—**General Supply Co., 1920 McGee Trafficway, Kansas City, Mo.**

Hoisting Ladder Eliminates Climbing

No climbing is necessary to get a load up this lader—a powered carrier does all the lifting.

The Drummond-Taylor hoisting ladder elevates loads at speeds as high as 105 fpm. A foot control governs the lifting speed while a friction clutch holds the load at any desired elevation. A manual drag brake controls the carriage on its descent.

Either gasoline or electric drives power the lightweight aluminum alloy lifting unit. Carriers are available for handling various loads including bulk materials.—**Bush Mfg. Co., 900 Rochester Rd., Clawson, Mich.**

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- You can pay $12 a dozen more, but you can't buy as much shovel as you get in RAZOR-BACK.
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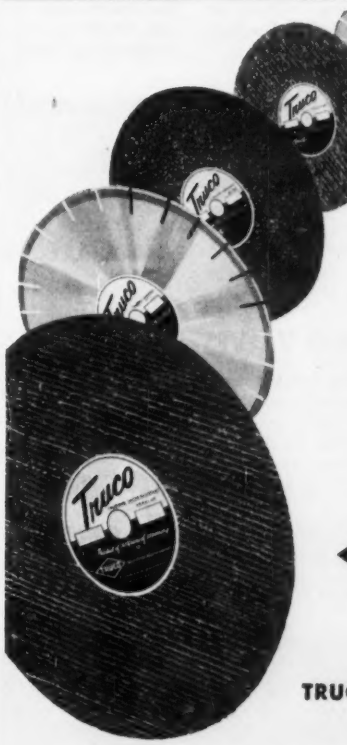

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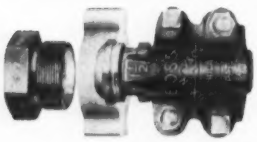

Also available in Washer Type, Style W-16. Companion Male, Style MX-16.

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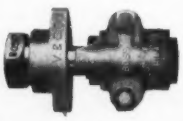

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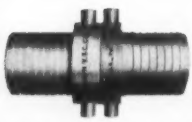

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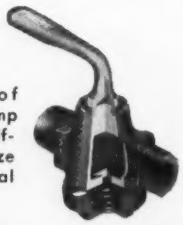

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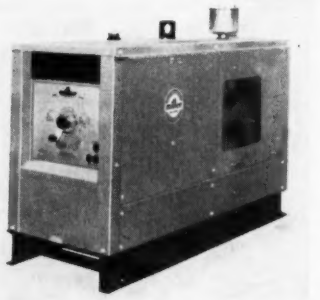
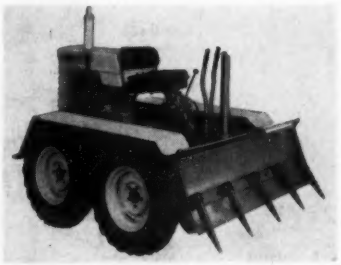


Diesel-Powered Welder

A 3-cyl, 38-hp Hercules diesel engine drives the Miller combination welder-generator. The dc welding ranges are 50-200 amp and 150-350 amp. The rated output is 250 amp dc at 40 v. Maximum open circuit voltage is 65.

Single-phase, 60-cycle ac power output is 12 kw, 115-230 v. The unit develops 6.5 kw ac while welding. Auxiliary dc power while welding is 1 kw, 115 v.—**Miller Electric Mfg. Co., Inc., Appleton, Wis.**



Four-Wheel-Drive Rig Weighs Only 2,000 Lb

A small four-wheel drive tractor built by Detroit Tractor, Ltd., weighs only 2,000 lb without attachments. The tractor can handle a bulldozer or several different buckets. Heaviest of these is a loader attachment bringing the total weight up to 2,400 lb.

The bulldozer unit includes a scarifier and removable wing plates. For blading jobs, the attachment may be set at 15 deg to the right or left. Capacities of the buckets are ½ yd each. The loader handles ¼ yd and can dump at a height of 8½ ft.

A 4-cylinder, 15-hp Continental engine powers the rig. It is equipped with a sliding spur type transmission, a chain drive, and hydraulic brakes. Maximum road speed is 6 mph.—**Detroit Tractor, Ltd., 1221 E. Keating Ave., Muskegon, Mich.**

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New Publications

These catalogs and bulletin from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

DRILLING EQUIPMENT—A 12-p bulletin (KMO-633) describes the KA-MO line of air, hydraulic, electric, and gasoline powered drills for horizontal, vertical, and angular drilling and boring. The bulletin includes a reference guide to the KA-MO line, a table of specifications, and a table of boring capacities.—**KA-MO Tools Dept., Kwik-Mix Co., Div. of Koehring Co., Port Washington, Wis.**

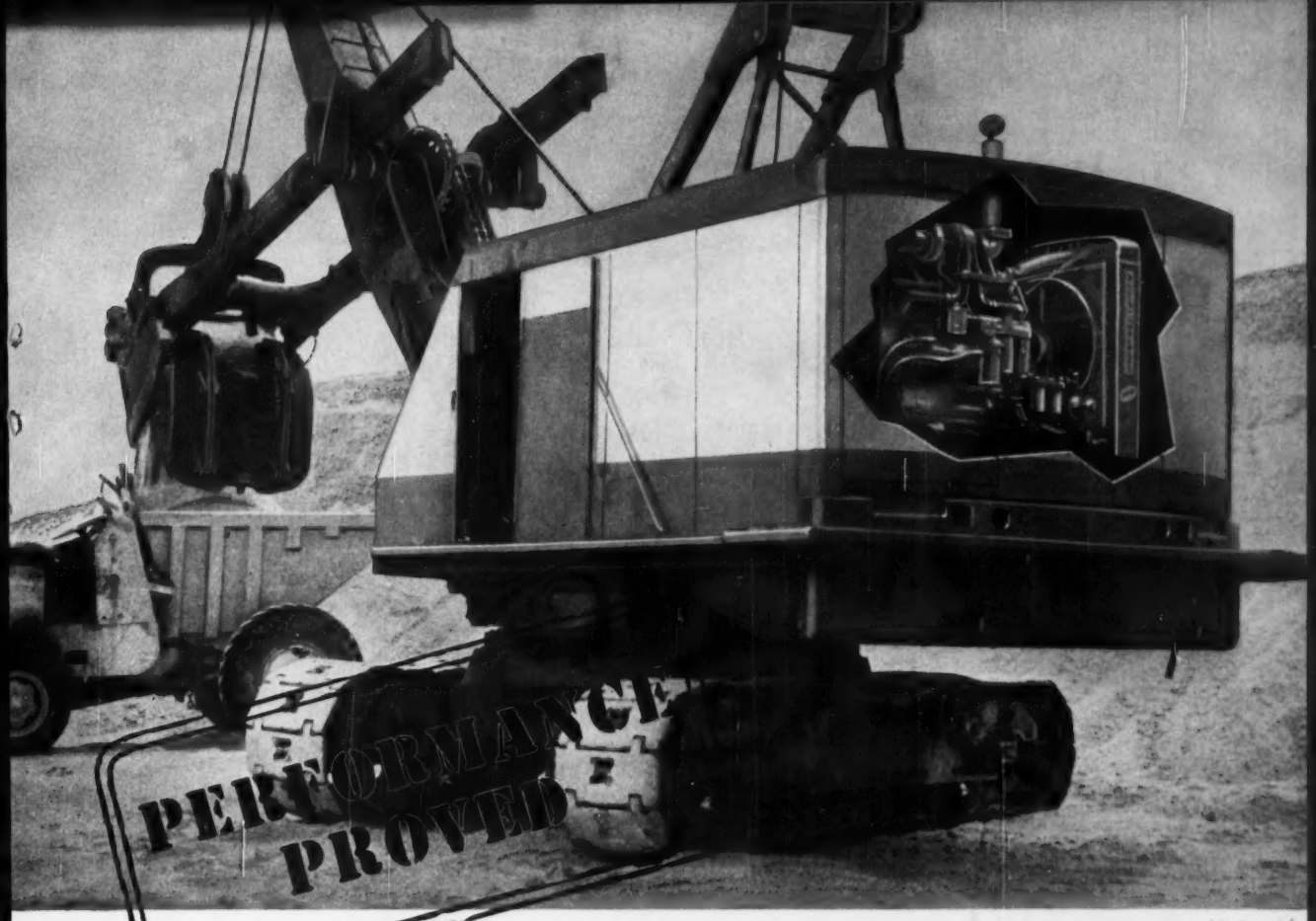
RETARDERS IN CONCRETE—Two booklets provide detailed information on the application and effects of Daratard in the retardation of initial set in concrete. They are titled Retarders and Plastic Concrete. The latter publication also covers Darex AEA, an air entraining agent, and WRDA, a water reducing agent. —**Dewey and Almy Chemical Div., W. R. Grace & Co., Cambridge 40, Mass.**

SIDEWALK CANOPIES—New 6-ft-wide sidewalk canopy frames, developed by Patent Scaffolding, are illustrated in a 4-p brochure. The booklet contains application details for overhead construction work in populated areas. — **The Patent Scaffolding Co., Inc., 38-21 12th St., Long Island City 1, N.Y.**

FRONT-END LOADERS—Separate booklets give details, including specifications, of two Eimco front-end loaders. Booklet L-1091 features the 105 Excavator in operation on three recent tunneling jobs. Bulletin 1-1092 illustrates the 126 front-end loader with details of the 205 hp diesel engine.—**The Eimco Corp., P.O. Box 300, Salt Lake City 10, Utah.**

ARC WELDING ELECTRODES—Electrode Pocket Guide, a 64-p booklet, covers all types of electrodes available from Airco with applications, procedures, and pertinent ASTM data. Two foldouts contain charts of recommended

continued on page 214



"We tried burying the bucket in the bank but couldn't... thanks to that 21000 diesel"

— That's a comment on performance of the Allis-Chalmers 21000 diesel repowering a 2½-yd shovel belonging to the Electro-Metallurgical Co., Ltd., Killarney State, Ontario.

PERFORMANCE PROVED

"It now seems to have twice the power," says the operator of a Pennsylvania-owned machine in which a 16000 diesel replaced the original engine of another make.

PERFORMANCE PROVED

"17% less fuel, 30 minutes less trip time" — These are the savings effected when a 21000 diesel repowered a truck operated by a logging company in Idaho.

PERFORMANCE PROVED

"Plenty of reserve, with economy and dependability to boot," states the owner of Minnesota Construction Company, who has several pieces of equipment powered by 16000 and 21000 diesels.

"We can hardly believe the fuel economy" —"'Startingest' engine we ever had" —"Don't understand why anyone would want an old-fashioned 'smoker' again," comment others. Everywhere, on every type of installation, the amazing 16000 and 21000 are "performance proving" their greater economy, their top usable power, their superior starting. If you want diesel advantages like these, see your Allis-Chalmers dealer for details. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

***POWER* FOR A GROWING WORLD**

AC ALLIS-CHALMERS

BC-25

No doubt about it—big trucks make the money where there's sand and gravel to be moved. Zook Brothers Construction Company of Bigfork, Montana, will move more than 90,000 tons during their resurfacing job on the Meriwether Trail. Here one of their Mack B-813SX dumpers takes on a 15-yard load at the gravel plant.

You can put when

Macks have everything needed for dependable, profitable operation in on- or off-highway construction. Maneuverability and ease of handling for fast spotting and dumping. Ability to haul maximum payloads with low operating costs. Mack Balanced Bogie with Power Divider and self-steering design gives outstanding tractive ability and maximum tire life. Only routine maintenance requirements. These are sensible reasons why you can't

Specs for Montana's Highway 28 called for a 5-inch layer of sand as a choker course. Hilde Construction Company of Great Falls found their Mack B-73S dumpers with Balanced Bogie ideal for pulling through the soft surface of the sand pits. Here the Macks move up to the loader.

down roads more profitably you're backed by MACKS

afford to operate anything but Mack trucks.

Your nearest Mack branch or distributor will be glad to give you on-the-job performance figures and the names of Mack users near you. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

Y295

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TRUCKS

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for over 5 straight years
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by far in sales of diesel trucks

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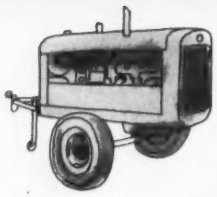

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you save.....	$ 230	–	$ 1,685

Ask for complete savings comparison chart!

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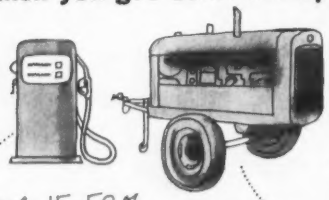
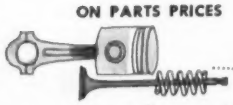


3 and you get Schramm maintenance savings



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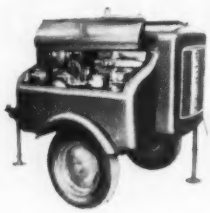
Savings with Schramm piston-type compressors in any size, the day you buy. Then you keep on saving with Schramm's full-rated air delivery, extra power, low maintenance and fair play on parts prices. Check now. Complete line; gas or diesel, with hefty economies in every compressor size.

See your nearest Schramm dealer listed in the Yellow Pages, or write for more facts.



Schramm AIR COMPRESSORS

604 North Garfield Ave., West Chester, Pa.

Schramm, Inc., manufacturers of Rotadrills (Pneumatractor Mounted, Truck Mounted, Crawler Mounted). Air Compressors (Portable, Stationary) Self-propelled Air Compressors (Pneumatractors) and Booster Compressors

NEW PUBLICATIONS . . .

continued from page 210

Airco electrodes for welding ASTM and trade name steels and comparison tables of mild steel and hardfacing electrodes. The edition includes an Airco conformance table to government specifications, descriptions of stainless steel iron powder type electrodes, a guide to electrode reconditioning, and data on new hardface electrodes.—**Air Reduction Co., 150 E. 42 St., New York 17, N.Y.**

TRUCK CRANE—A new 60-ton American 700 Series truck crane is described in a 16-p catalog. Details of machinery layout, air controls, and attachments are included.—**American Hoist & Derrick Co., St. Paul 7, Minn.**

CEMENT BATCH PLANT — Heltzel describes its bolted type circular cement storage and batching plants in an 8-p booklet. Included are specifications, details of the basic plant construction, and illustrations of manual and automatic batching equipment. The company has also issued a 1-p bulletin detailing its dustless cement batcher.—**Heltzel Steel Form and Iron Co., Warren, Ohio.**

WELLPOINTS — Details of the Moretrench 2-in. self-jetting wellpoint are featured in a 4-p brochure. Seven component parts of the wellpoint are illustrated and explained. The publication also covers briefly other type wellpoints for special jobs.—**Moretrench Corp., Rockaway, N.J.**

SIDE-BOOM TRACTORS—Two Caterpillar pipelayers, No. 572 Series D and MD7, are featured in a 4-p brochure that includes specifications and design features. Copies are available from dealers or by ordering form 3342.—**Caterpillar Tractor Co., Peoria, Ill.**

SCRAPER — International describes its model 295 Payscraper in a 24-p catalog. Included in the publication are details of the tapered bowl design, the 375-diesel engine, physical dimensions and specifications.—**International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.**

EPOXY COMPOUNDS—A technical bulletin on applications of six new epoxy compounds for

bonding, patching, sealing joints and cracks, coating concrete surfaces, and resurfacing pavements is available from Sika. The booklet SEC 759 includes instructions for using each of the compounds. **—Sika Chemical Corp., 35 Gregory Ave., Passaic, N.J.**

OPEN WEB JOISTS—Ceco open-web steel joists for lightweight construction are covered in a 28-p booklet. Included are diagrams and descriptions of series S, L, and E/C, the latter being an electro-channel joist with its top chord replaced by a hollow duct. The booklet also contains information on Ceco's steel roof deck and Cecor centering used as a permanent form material for concrete slabs over steel joints or beams. — **Ceco Steel Products Corp., 5601 W. 26 St., Chicago, Ill.**

RADIAL PRESTRESSING — A 16-p booklet describes radial prestressing of concrete, a new prestressing method that makes possible the casting of large, thin wall panels. It contains a complete discussion of radial prestressing principles, techniques, and products. — **Radistress Co., Temple Dr., Tallahassee, Fla.**

LEAD-ASBESTOS PADS — The use of lead-asbestos pads to reduce or eliminate vibration in buildings near railways or heavy traffic is described in a 4-p brochure. Step by step photographs show how the pads are positioned and grouted in the footings of buildings.—**Lead Industries Assn., 60 E. 42 St., New York 17, N.Y.**

TRANSLUCENT PANELS — A catalog features the complete line of Sanpan translucent panels, window walls, and curtain wall systems. It contains full size and scale drawings of all panel types and accessory framing sections. Several installations are illustrated.—**Panel Structures, Inc., 45 Greenwood Ave., East Orange, N.J.**

DRAGLINE BUCKETS—A 4-p folder contains data on a complete line of medium and lightweight dragline buckets. A specification chart is included for lightweight buckets ranging in size from ⅜ to 4½ cu yd and for medium weight buckets ranging from ½ to 3½ cu yd.—**M. P. McCaffrey, Inc., 2121 E. 25 St., Los Angeles 58, Calif.**

continued on next page

Cut costly stripping & resetting time with these

NEW FORM HANDLING FRAME*

Strips and repositions both side forms in one quick smooth action. Pulls and resets sections 50-foot or longer with ease.

NEW Form-Crete® STEEL FORMS

The new forms and handling frame shown on this page were developed for one specific reason—to help you cut your operating costs. Each feature, the form-locks, the tilt-back, and the handling frame was fully tested under working conditions for many months. In every test, the results were the same—faster stripping and resetting of forms. Get the full story. Clip the coupon below and ask your local Form-Crete man for full details.

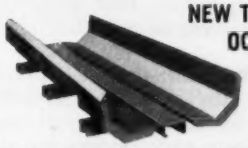
NEW CHANNEL FORM WITH FORM LOCK

Locked in perfect alignment during casting operation, the sides of this form flex out when locks are released allowing quick removal of product.

NEW SQUARE PILING FORM WITH FORM LOCK

Form-Lock feature locks sides in perfect alignment for pouring. When locks are released, sides flex away from product for easy stripping.

NEW TILT-BACK OCTAGONAL PILING FORM



Easily removed braces permit hinged form to swing away for quick removal of cast product.

*Patents applied for

PF-18

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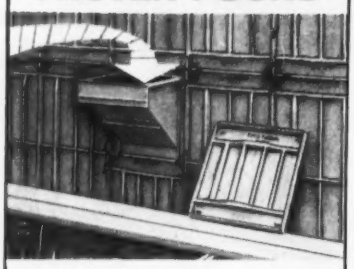

with this side chute

Save time! Pour concrete with the use of the convenient EFCO Side Chute. After use, side chute is quickly replaced with regular EFCO panel. Send coupon for details of other money-saving EFCO features.

ECONOMY FORMS CORP. EFCO ECONOMY FORMS

Economy Forms Corp.
Box 128-N, H. P. Station
Des Moines, Iowa

Please send catalog on EFCO Steel Forms, and address of nearest sales office (there are 28 coast-to-coast).

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Firm name_____

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$2.10 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Positions Wanted undisplayed advertising rate is one-half of above rate, payable in advance.

NEW PUBLICATIONS . . .
continued

NEW TRANSMISSION — Mechanical details of Caterpillar's new Power Shift transmission are described in a 6-p booklet. Schematic drawings illustrate the flow of power through two sets of planetary gears and the torque converter. The booklet also explains how the features of direct drive and torque converter equipped tractors are combined in the new transmission available on Cat D9 series E and D8 series H tractors.—**Caterpillar Tractor Co., Peoria, Ill.**

TOOL CATALOGUE — A 12-p catalogue from Bruner & Lay, Inc., contains illustrations and specifications for every tool in the firm's line, including carbide Rok-Bits, drill rods, striking bars, moil points, clay spades, and asphalt cutters. It also includes details of a new line of rope thread blast hole drilling tools.—**Bruner & Lay, Inc., 9300 W. King St., Franklin Park, Ill.**

COMPRESSOR—Davey describes its Model 600 RP Hydrovane rotary compressor in a 4-p bulletin. Contents include a diagram and explanation of multiple stage rotary compression with patented Perma-Vane blades, and complete specifications. — **Davey Compressor Co., Kent, O.**

JOIST HANGERS—A 4-p technical booklet details Teco-U-Grip joist and beam hangers for 3x6 to 3x14 and 4x6 to 4x14 wood members. It includes applications and specificiations and explains how to determine the maximum span supported by individual types of Teco-U-Grips.—**Timber Engineering Co., 1319 18th St., N.W., Washington 6, D.C.**

BACK-RIPPERS—A new folder discusses the principles and techniques of back-ripping. It describes how back rippers are attached to all models and sizes of bulldozer blades. — **Preco, Inc., 6300 E. Slauson Ave., Los Angeles 22, Calif.**

CONCRETE SAWS—A 4-p brochure on concrete saws and blades points out applications for concrete saws and suggests the size and horsepower for each. — **Eveready BrikSaw Co., 1104 Union Ave., Kansas City 1, Mo.**

47 top experts guide you in

Design, construction, and operation of today's HIGHWAYS

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HERE'S a big, fact-packed handbook on modern highway engineering — covering the entire field from financing, planning, and traffic engineering to design, construction, maintenance, and landscaping. In its 28 profusely illustrated sections by 47 outstanding authorities you quickly and easily find the information you want on today's best highway practices.

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THIS comprehensive reference brings you a wealth of usable facts, methods, and data on such topics as finance and administration, route selection and layout, soil mechanics, testing, highway materials, basic highway design, rigid pavements, flexible pavements, and other aspects of highway engineering. Particularly helpful information is given on design of pavements to resist slipperiness . . . distribution of soils in North America . . . frost and permafrost as it affects highway design . . . photogrammetric techniques . . . and much more. All of this comes to you in clear, authoritative terms, with hundreds of helpful illustrations.

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Bethlehem Rope on West Virginia Highway—Interstate 77 is an important link now taking shape in West Virginia's growing network of express highways. A north-south, 4-lane route connecting Parkersburg and Charleston, the new road will offer motorists a direct tie-in with the West Virginia Turnpike. This picture was taken recently during rough grading near the site of the Goldtown Interchange, near Sissonville, performed by Harrison Construction Company, Pittsburgh, Pa. Husky Bethlehem Wire Rope in various sizes is used here extensively, not only on drop-ball cranes, but also on draglines and shovels, scrapers, and bulldozers.

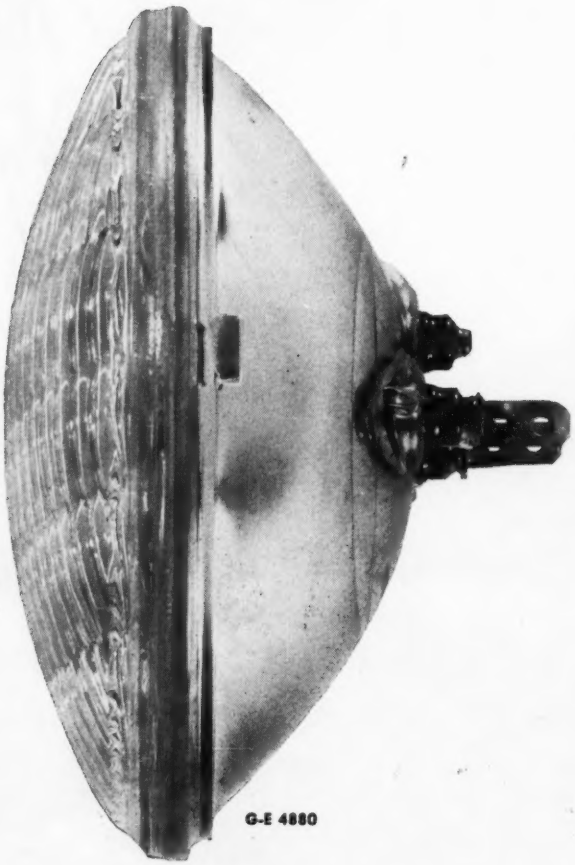
Bethlehem Steel Company, Bethlehem, Pa. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem Wire Rope

BETHLEHEM STEEL

NOW! GENERAL ELECTRIC OFFERS A COMPLETE LINE OF *All-Glass* CONSTRUCTION LAMPS

- ✓ Far-seeing flat beam
- ✓ No inner bulb
- ✓ Reflectors never need cleaning
- ✓ Spattering won't crack lens
- ✓ Maintenance greatly reduced
- ✓ See better in all kinds of weather
- ✓ 6, 12, 24-volt size



General Electric now offers a complete line of all-glass lamps —especially designed for high-speed, off-highway earth moving equipment. They all feature high candle-power *plus* a flat, far-seeing beam. Special filament shield blocks stray upward light, reduces "bounce-back" glare, lets operators see better in any weather . . . even in dust!

Whatever the job, a G-E all-glass C.I.M. Lamp will provide the best light for it. Nothing gets past the hermetic seal of lens to reflector, so reflectors never need cleaning. No inner bulb to blacken; special hard glass won't crack in rain or snow, and they take rough treatment day after day. Choose from a wide range of sizes and styles, and specify the *right* all-glass lamp for any construction, mining and industrial equipment. Ask your G-E supplier for full information. General Electric Co., Miniature Lamp Dept. M-04, Nela Park, Cleveland 12, Ohio.

SPECIFICATIONS FOR G-E C.I.M. LAMPS

G-E No.	Circuit Volts	Watts	Bulb Diameter
HEADLAMPS			
4080	6	50	5¾"
4480	12	60	5¾"
4880	24	60	5¾"
FLOODLAMPS—PAR 46 bulbs—2 contact lugs			
4078	6	50	5¾"
4478	12	60	5¾"
4578	24	60	5¾"

Progress Is Our Most Important Product

GENERAL ELECTRIC

Filter Care Reduces Downtime

THE ENGINE AIR CLEANER and the various filters are the front line of defense against downtime. Dirty air and oil will ruin even the best equipment.

Knowing when to replace filters can prevent premature breakdown of machines. Here are the characteristics of various filters and recommendations for their service.

Lube Oil Filter

A lube oil filter removes abrasives and maintains the required flow of oil. It should not return dirt to the oil or remove additives.

Filters that keep lube oil light remove desirable additives. Oil becomes dark because special detergents hold in suspension the minute particles of carbon created by combustion. With Series 2 or 3 oils, darkening indicates carbon in suspension and a clean engine.

There is no way to tell when a crankcase filter is plugged and needs servicing. But each filter has a known dirt-holding capacity, and engineers can predict the service life of filters from experience. Recommendations for filter changes are based upon the amount of external dirt entering the machine during operation and the amount of abrasives formed internally by carbon, sulfur-bearing fuel, and minute pieces of worn metal.

The type of oil, kind of lube system (full-flow or by-pass), type of machine, and its application also affect filter life. Because of these conditions, recommended filter replacement times range from 50 to 1,800 service hours. In all cases it is best to follow the manufacturer's recommendations for both the time and type of filter replacement.

Manufacturers constantly test their own filters and those of other makers. These tests are based upon commercial dust with a known range of particle sizes that is added to the crankcase oil in controlled quantities.

Filter elements should remove abrasive particles larger than the microscopic oil film that separates precision-fitted parts. Particles smaller than the oil film need not be removed because they cause no measurable wear. Elements that remove such material quickly plug and cease to filter.

Some filters are designed to trap water, but this is not a filtration problem because water vaporizes out the breather cap when the engine reaches operating temperature.

Fuel Oil Filters

Primary fuel filters are standard on some tractors and can be field-installed on most equipment. They are located in the fuel supply line between the fuel tank and the transfer pump.

These units remove impurities from the fuel before it enters the transfer pump and main filter housing, increasing the life of both components.

The fuel gage indicator is the guide to changing fuel filter elements on Caterpillar equipment with or without primary fuel filters. When the gage reads "OUT" (red range), wash the metallic screen of the primary filter in kerosene or diesel fuel and replace it. If the gage still reads "OUT," change the disposable elements in the main filter housing.

These elements collect dirt until fuel does not flow at a sufficient rate to maintain good engine performance. Some filters, such as the resin-impregnated, cellulose fuel filters in Caterpillar machines cannot be washed or otherwise restored.

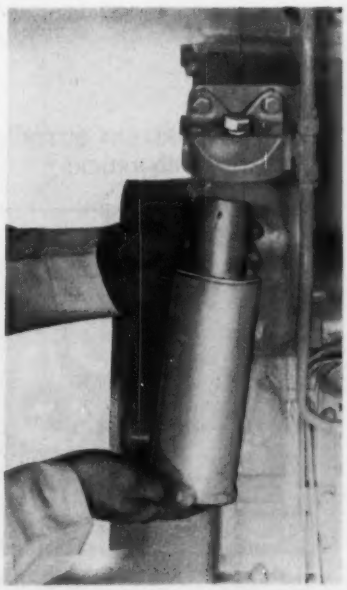
Hydraulic Oil Filter

Hydraulic oil filters, like those for lube oil, give no visible sign of plugging. But the same predictable factors mentioned for lube oil filters apply to the hydraulic system.

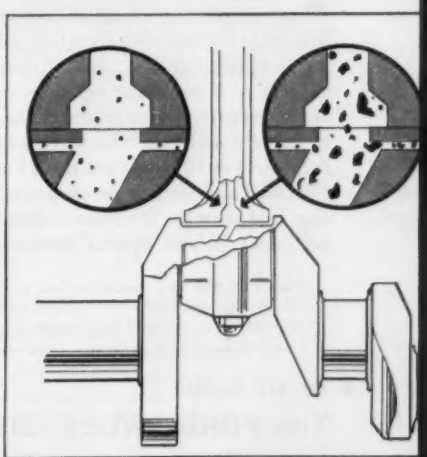
Special attention is given during manufacturing and shipping to insure an absolutely clean hydraulic system. Great care should be taken to keep out dirt when changing filters, filling with oil, or replacing lines or hoses.

The first change of the hydraulic filter in a new machine comes

continued on page 222



PRIMARY FILTER—It removes dirt before fuel enters transfer pump and main filter.



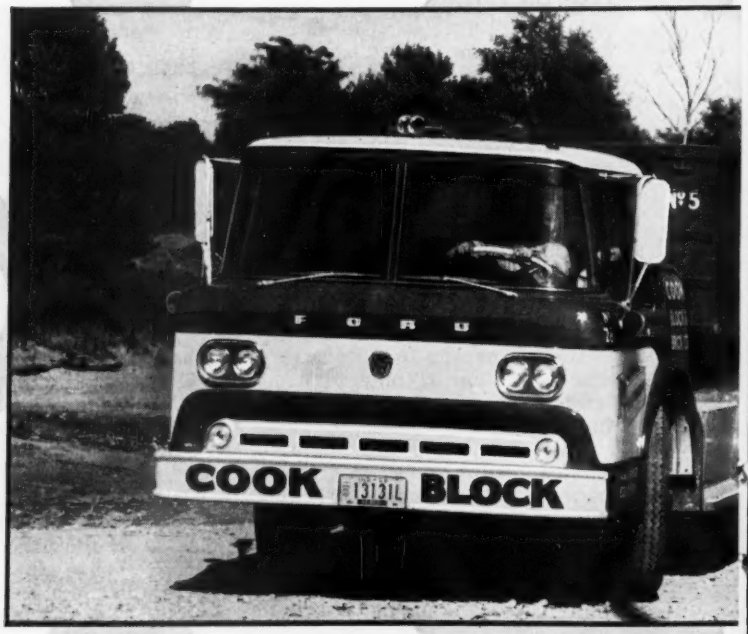
PROPER FILTERING—A lube oil filter must remove only the larger dirt particles. Minute impurities cause no damage to the machine but clog up the filter unnecessarily.

Here's another reason why Ford Trucks are your best buy!

"OF ALL THE MAKES WE'VE TRIED FORD TRUCKS GIVE US THE LOWEST MAINTENANCE COST!"

ANOTHER REPEAT BUYER OF FORD TRUCKS

Virgil E. Cook, owner of Cook Block and Brick Co., is convincing proof that there is still plenty of opportunity in American business for those sound planning, hard working individuals who want to own their own business. Starting from scratch just 13 years ago, he now owns and operates one of the largest concrete products plants in Eastern Indiana. The workhorses in his fleet of 16 trucks are three Ford Tilt Cab Tandems that are used to haul sand and gravel to the plant and make deliveries in and around Anderson.



Hard-working Ford CT-950 tractor leaves Cook gravel pit with 18 yards of aggregate. Aluminum walking beam and rubber suspension system of tandem axle assembly reduce chassis weight, permit higher legal payloads.

Cook's CT-850 with special flat-bed body and Side-O-Matic unloader delivers blocks right to the job site. Unit carries 600 concrete blocks and spots them where needed.

Be sure to visit

The FORD TRUCK DISPLAY

National Ready Mix Concrete Assoc.
Chicago Coliseum, Booths 16-17

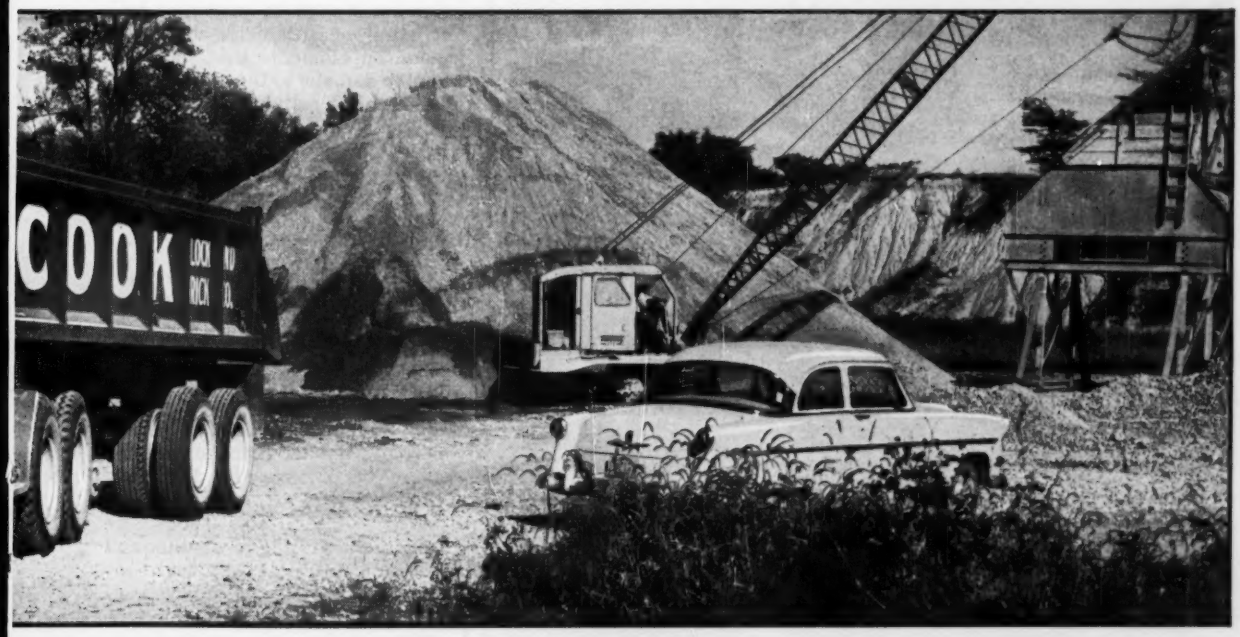
FEBRUARY 15-18

"Our experience has proved that Ford Trucks can be operated at substantially lower maintenance costs than any other make we've tried. And, equally important in a fleet like ours, we find that our Fords spend much less time in the shop. None of the Ford units purchased since 1958 have been in for major repairs and I am still amazed at the way the older ones keep going.

"The best truck we've ever owned is a 1954 Ford C-700 that consistently carries a load of 350 to 400 blocks over all types of terrain. In spite of this severe work it ran 125,000 miles before we replaced the engine. This unit now has over 140,000 miles on the original ring gear and pinion and it went 60,000 miles before we relined the brakes and put in a new clutch. This is outstanding mileage when you consider that we've realized as little as 12,000 miles from competitive ring gear and pinion sets. Clutch and brake life obtained with other makes in identical service was only 20,000 miles. It's results like this that keep our costs low and convinced us that we should stay with Fords when we bought our bigger trucks in '58.

"Our 1958 and 1959 Ford Tilt Cab Tandems give every indication of equalling or surpassing the fine records set by the C-700. The two CT-950 tractors hauling sand and aggregates to our processing plant breeze through traffic and take the hills like they weren't there at all. Our CT-850 equipped with a flat-bed body has the power and traction to deliver finished products anywhere. With Ford's tilt-cab design we get a real plus as far as payload is concerned because we can carry at least 2,000 pounds more weight on the front axle.

"We buy Ford Tilt Cab Trucks because we think they're the best engineered and most modern gasoline trucks in the heavy-duty field. Here at last is a truck built to permit big legal payloads with enough power to move these loads at economical speeds. We pride ourselves on our modern and efficient equipment and consider our Fords one of the most valuable assets of our business."



'60 Fords are built for longer life . . . with Certified Durability!

Whatever your job . . . wherever you do it . . . you'll discover just as Mr. Cook did, that Ford Trucks are the best investment for your transportation dollar.

Certified results of tests conducted by America's leading independent research organization (name available on request) confirm the fact that Ford Super Duties have been refined for still more durability! Automatic radiator shutters, improved electric fuel pumps and redesigned wiring harnesses are typical of the advancements to be found in these units.

Automatic radiator shutters reduced the coolant temperature variation recorded in severe mountain road tests from a 79° range to a 20° range. Engine operation with coolant temperatures in the 167° to 187° range means less expansion and contraction, more efficient combustion and better lubrication . . . all of which contribute to longer engine life.

Dynamometer tests showed *no vapor lock* with Ford's submerged-type electric fuel pump at temperatures up to 200°. Incipient vapor lock with mechanical fuel pump resulted in a power loss of 9% under the same conditions. Shaker table tests plus constant exposure to oil, water and heat proved 1960 wiring harness to be *three times longer lived.*

FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . . BUILT TO LAST LONGER, TOO!

sooner than subsequent, standard change intervals. For example, the full-flow element in the Cat No. 933 Traxcavator hydraulic system should be replaced after the first 125 service hours and every 500 hours thereafter.

Transmission Filter

In many cases, the elements in the transmission and crankcase lube systems are the same. Most manufacturers make suggestions for transmission filter change periods.

On new machines, the first change of transmission filter elements, like those of hydraulic systems, comes sooner than following filter changes.

Dry-Type Air Cleaner

The dry-type air cleaner consists of a filter case that supports a resin-impregnated cellulose filter element and collects dust.

Regular service intervals and close visual inspection are necessary for proper cleaning of engine air. Service periods vary with weather and working conditions. When dust is severe, it is necessary to service the unit frequently; the filter elements should be inspected and cleaned at least every 50 service hours.

To lengthen the element's life, the engine exhaust and air cleaner inlet pipes should be arranged so as to prevent exhaust and oil fumes from entering the cleaner.

Service periods can be determined by measuring the air cleaner's restriction with a vacuum gage or manometer installed at the cleaner outlet. The cleaner needs servicing when its restriction reaches 30 in. of water. Restriction measurements should be made on elements that show no visible damage to the sealing surfaces or the cellulose.

Excessive engine exhaust smoke or loss of power also may indicate the need for servicing. Dry-type air cleaners can be cleaned with air or water and reused if they are undamaged.

Oil-Bath Air Cleaners

Oil-bath air cleaners work efficiently only as long as the oil in the cup is thin enough to spray into the filter sections and wash back the dirt collecting there. The oil should be changed when it becomes thicker than normal because of particles of dust suspended in it.

These filters also should be serviced according to weather and working conditions. In bad conditions, service may be necessary every 5 hours; in better circumstances, it may be needed only every 60 hours.

When refilling the oil cup, both the inner and outer sections must be filled to the oil level bead. Overfilling prevents proper oil spray action in the air cleaner. Never attempt to change the filter oil while the engine is running. Doing so permits dirty oil in the screens to contaminate the fresh supply and also causes too high an oil level.

Screens should be washed in a pan of kerosene or non-inflammable cleaning fluid. At least once a year, the entire unit should be removed from its support to flush out the fixed screens in the upper part of the filter body.

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Model RE YORK RAKE speeds up grading and lawn-building job in preparation for seeding.

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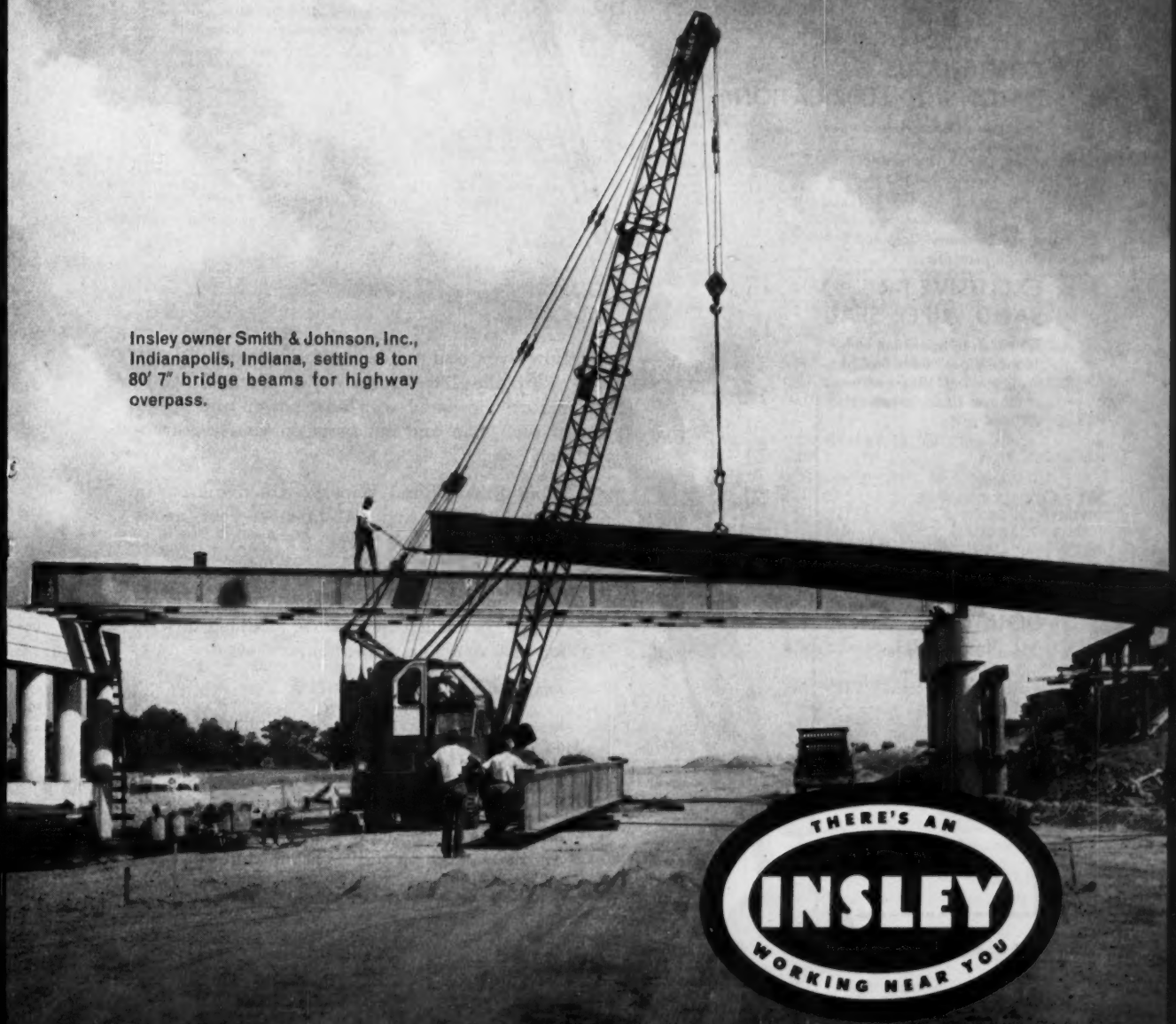

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Methods Memo . . .

Pipe Builder

This machine builds continuous concrete pipe in the trench at a rate of 8 to 12 ft a minute. It's the invention of R. Fuller and is produced by the Fullerform Continuous Pipe Corp. of Phoenix, Ariz.

Fuller has been building irrigation conduits in Arizona with the machine for about a year. He also is working with the city of Phoenix on plans to adapt the machine for the construction of storm sewers.

The machine works with inflatable rubber and fabric forms designed by Goodyear Aircraft Corp. These hose-like forms are open at both ends to hold airtight bulkheads through which air pressure is applied to inflate them to 3 psi. The forms range from 50 to 300 ft long.

A cable from a winch pulls the double-hoppered machine along the trench. As it moves, it picks up the form from the bottom of the trench and tucks concrete under it with tamping devices powered by an electric motor. Half of the double hopper feeds concrete into the bottom of the trench; the other half pours the top of the pipe.

About two hours after the concrete has been poured, the form can be deflated, pulled out, and moved ahead.

A Warning

The construction industry needs to enlist thousands of new workers, and the industry is doing altogether too little to find and train these workers.

The Department of Labor reports that the number of young men in the registered apprentice program declined again in 1959. This is the second consecutive year that participation in this training program has dropped off.

From 1950 to 1958 men in the 20 to 24 age group represented an average of 8.1% of the total construction labor force. That is far below the 9.4% average of men in this age group in all non-agricultural industry.

The Labor Department estimates that the construction industry will need to increase its total labor force by 45% in the next 10 years. And, in addition, it will need to replace the 20 to 25% of the current labor force that will be lost by retirement and death before 1970.

Soviet Concrete Is Like Iron

A Russian scientist has developed a process to produce concrete with the strength and elasticity of cast iron, according to Tass, the Russian news agency.

The process involves putting concrete through rolling mills at pressures of 28,440 to 42,660 psi. Michail Stankevitch, inventor of the process, claims that concrete of this type can even be "welded." Subjecting the edges of concrete shapes to a chemical reaction softens them enough to permit high-pressure jointing.

A Construction Industry Center

This $3-million project in Dallas is planned to serve the construction industry. It will include office space and permanent display facilities for manufacturers of building materials, an auditorium to seat 560 people, a restaurant, a private club, and a technical library.

Dallas builder Edmund G. Peterson, one of the sponsors of the 254,000-sq-ft center, said construction will begin later this year, and the building will be ready for occupancy in 1961. It will be called Fleetwood Square.

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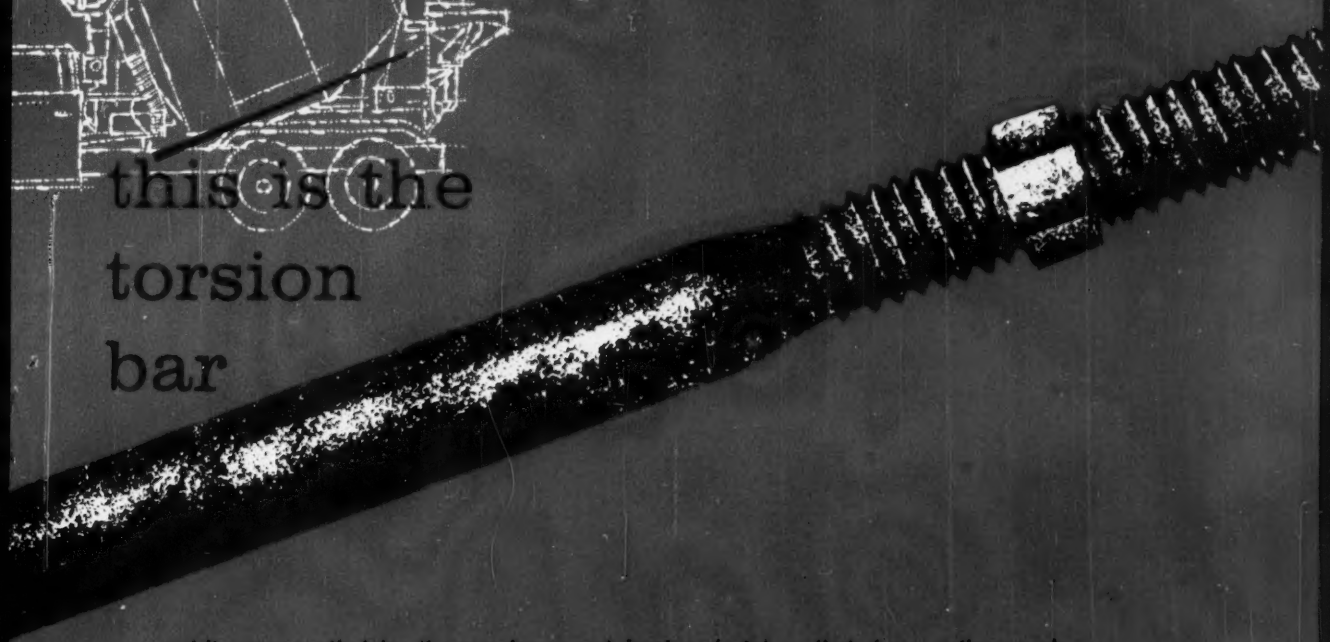

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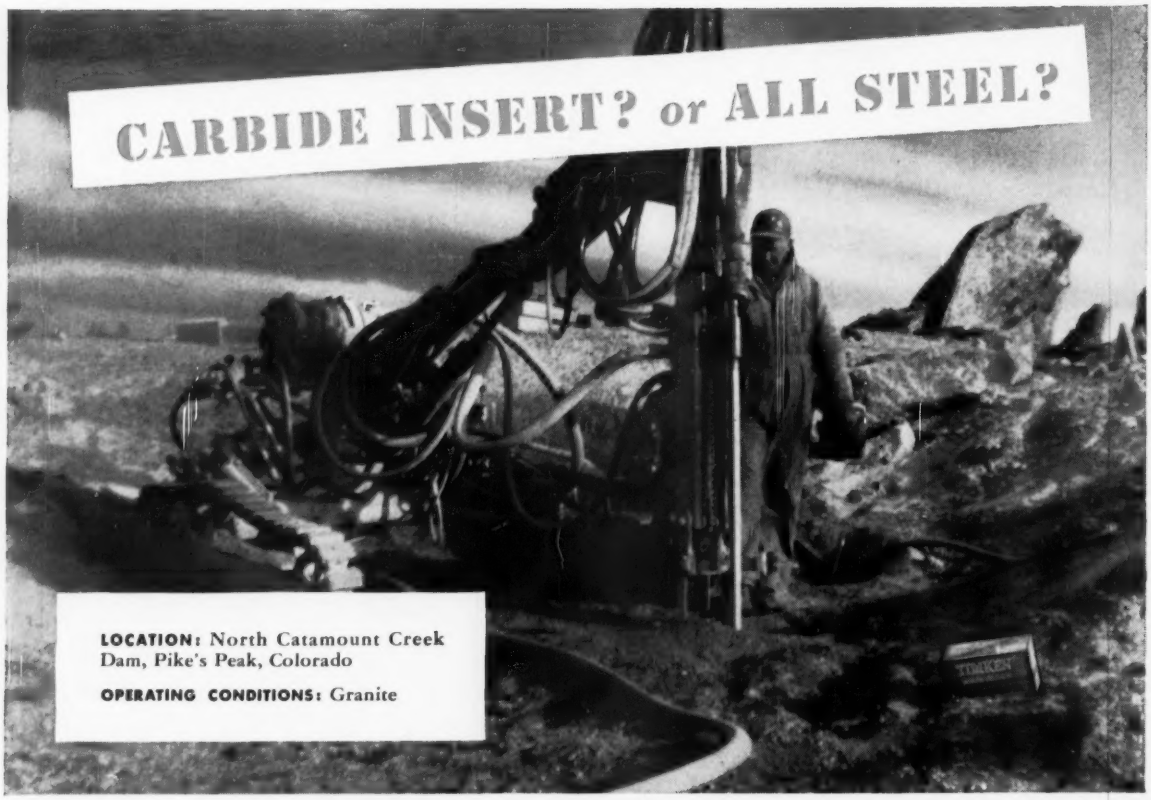

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